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VOLUME IV

THE GENERATION AND RADIATION OF SUPERSONIC JET NOISE
VOLUME IV SHOCK-ASSOCIATED NOISE DATA

LOCKHEED-GEORGIA COMPANY
MARIETTA, GEORGIA 30063

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TECHNICAL REPORT AFAPL-TR-76-65
FINAL REPORT FOR PERIOD 6 NOVEMBER 1972 - 6 NOVEMBER 1975

Approved for public release; distribution unlimited

DEPARTMENT OF TRANSPORTATION
OFFICE OF NOISE ABATEMENT
WASHINGTON, D.C.

AIR FORCE AERO-PROPULSION LABORATORY
AIR FORCE WRIGHT AERONAUTICAL LABORATORIES
AIR FORCE SYSTEMS COMMAND
WRIGHT-PATTERSON AIR FORCE BASE, OHIO 45433

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This final report was prepared by the Lockheed-Georgia Company, Marietta, Georgia, under Contract F33615-75-C-2032. The effort was sponsored by the Air Force Aero-Propulsion Laboratory, Air Force Systems Command, Wright-Patterson AFB, Ohio and the Department of Transportation under Project 3066, Task 14, and Work Unit 08 with Mr. Paul A. Shahady (AFAPL/TBC) as Project Engineer. Dr. Gordon Banerian was the Project Manager for the Department of Transportation. Dr. Harry E. Plumblee of Lockheed-Georgia was technically responsible for the work.

This report has been reviewed by the Information Office, ASD/OIP, and is releasable to the National Technical Information Service (NTIS). At NTIS, it will be available to the general public, including foreign nations.

This technical report has been reviewed and is approved for publication.

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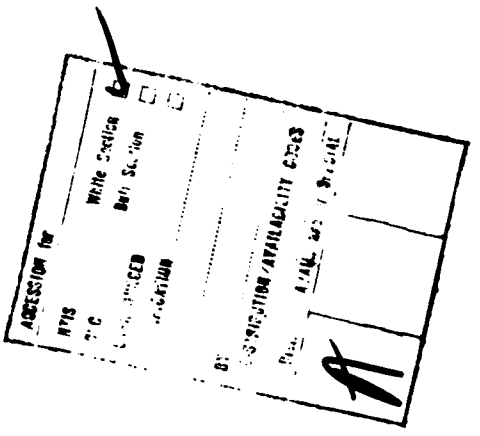

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This report is published in four volumes. Volume I summarizes the work accomplished. Volume II contains a detailed discussion of work accomplished since the publication of the interim report, and all the major conclusions reached during the program. Volume III is a data report which presents a detailed compilation of the turbulent mixing noise 1/3-octave spectra. Volume IV (this volume) is another data report, and it contains the narrow-band spectra for broadband shock-associated noise.

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PREFACE

This report was prepared by the Lockheed-Georgia Company, Marietta, Georgia, for the Air Force Aero Propulsion Laboratory, Wright-Patterson Air Force Base under Contract F33615-73-C-2032. The report covers work done in the period 6 November 1972 through 6 November 1975. The work described herein is part of the Air Force Aero Propulsion Laboratory's joint program with the Department of Transportation to define and control the noise emission of aircraft propulsion systems.

Mr. Paul Shahady was the Air Force Aero Propulsion Laboratory's Project Engineer. The program is being conducted under Project 3066, Task 14. Dr. Gordon Banerian was the Project Manager for the Department of Transportation. Lockheed's Program Manager was Harry E. Plumblee, Jr.

Major contributors to the work performed under this contract and presented in this report are: Robert H. Burrin, Peter D. Dean, Philip E. Doak, Michael J. Fisher, Sham S. Kapur, Jark C. Lau, Geoffrey M. Lilley, William T. Mayo, Donald M. Meadows, Christopher L. Morfey, Philip J. Morris, David M. Smith, H. K. "Bob" Tanna, Brian J. Tester, and M. Clay Whiffen.

The assistance of the following individuals is gratefully acknowledged: C. Benton Reid and L. V. Mazzarella, who operated the test facilities and data acquisition systems; C. R. Huie, who helped in the buildup and operation of the laser velocimeter; R. B. Harrison and C. T. Walker, who constructed and maintained the acoustic and flow facilities; J. P. McKenna, who kept up with the budget and other administrative details, and last, but certainly not least, most gracious appreciation is extended to Barbara C. Reagan for her superb typing of all manuscripts.

Gratitude is expressed to the University of Southampton for permitting Professor Philip E. Doak, Professor Geoffrey M. Lilley, Dr. Michael J. Fisher, and Dr. Christopher L. Morfey to participate in the performance of the research reported herein.

This report was submitted on 23 June 1976.

Publication of this report does not constitute Air Force approval of the report's findings or conclusions. It is published only for the exchange and stimulation of ideas.

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SHOCK ASSOCIATED NOISE EXPERIMENTS

The characteristics of the sound field of shock-containing under-expanded jets are studied by measuring the noise from a two-inch diameter convergent nozzle over an extensive envelope of supercritical jet operating conditions. The measurements, which are accurate and comprehensive, were conducted in the Lockheed anechoic facility. The results are presented in this Volume in a systematic manner in the form of narrowband spectra. The details pertinent to the experimental program and the data presentation format are summarized below.

SCREECH SUPPRESSION

The total noise spectrum from an incorrectly expanded jet flow contains discrete components (or screech) in addition to the basic turbulent mixing noise and the broadband shock-associated noise. In order to study the trends and dependencies of the *broadband* component accurately, it is vital to keep the contamination by screech to a minimum in the experimental program. In the present experiments, screech suppression was successfully achieved by wrapping all surfaces surrounding the nozzle exit with sound absorbing material, and incorporating a small projection inside the nozzle lip. This projection interrupts the feedback loop between the first shock and the nozzle exit plane, which has been previously proposed and verified as the physical mechanism of screech generation. The detailed calibration tests, conducted prior to the main shock-associated noise experiments, established that all results are essentially uncontaminated by the presence of screech.

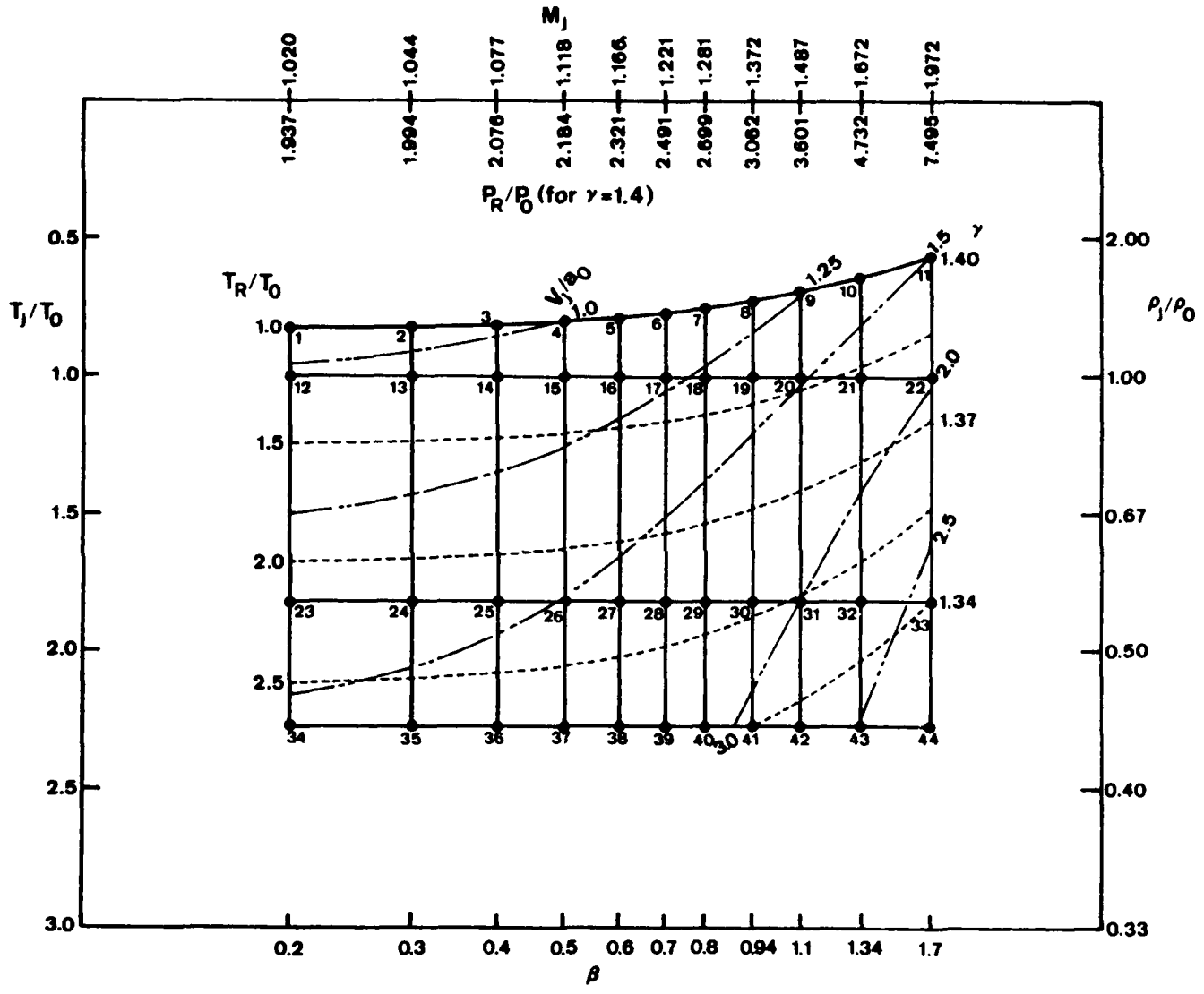
EXPERIMENTAL PROGRAM CHART

The jet operating conditions for the shock-associated noise experiments were chosen carefully to be compatible with the turbulent mixing noise experiments so that, whenever possible, the results from under-expanded (shock-containing) jets can be compared directly with the corresponding results from fully-expanded (shock-free) jets. The experimental program chart for shock-associated noise, somewhat similar to the experimental program chart for turbulent mixing noise (presented in Volume III), is shown on the following page. It contains all the information pertinent to the shock-associated noise test program.

The major difference between this chart and the previous chart for mixing noise experiments, arises from the observation that while the intensity of turbulent mixing noise (for a fixed measurement configuration) is essentially a function of jet exit velocity ratio [$I \propto (V_J/a_o)^8$], the intensity of *broadband* shock-associated noise is primarily a function of the nozzle operating pressure ratio, P_R/P_o. For the latter, the measured intensity has been observed to vary according to

$$I \propto \beta^4, \qquad \text{where} \quad \beta = (M_J^2 - 1)^{\frac{1}{2}}.$$

EXPERIMENTAL PROGRAM CHART SHOCK-ASSOCIATED NOISE



The experimental program has therefore been designed such that the jet operating conditions (T_R/T_o, P_R/P_o) chosen yield test points at reasonably spaced values of $\log_{10}\beta$.

The chart shows the values of β (and hence M_J and P_R/P_o) on the X-axis and the values of jet static temperature ratio T_J/T_o (assuming ideal expansion) on the Y-axis for the 44 test points that constitute the complete experimental program, covering a wide envelope of supercritical jet operating conditions of practical interest. By considering test points in each horizontal line, the jet efflux temperature is kept constant while varying the pressure ratio parameter β. Conversely, on each vertical line, a constant value of β is maintained while jet exit temperature is varied. Also shown on the chart are lines of constant total (or stagnation) temperature ratio, T_R/T_o, and constant jet exit velocity ratio, V_J/a_o. These two parameters have been calculated using the isentropic flow equations and therefore include the assumption that the jet flow is correctly expanded. The main reason for including these lines of constant T_R/T_o and constant V_J/a_o in the experimental program chart is to give an overall indication of the ranges of these parameters. But in addition, they serve to provide approximate values of these quantities for each test point, simply by a quick glance at the diagram.

The values of the parameter β were chosen such that in addition to obtaining reasonably spaced values of $\log_{10}\beta$, the twelve test points on the three vertical lines for β = 0.94, 1.34, and 1.70, are identical to the jet operating conditions used in the turbulent mixing noise tests for the three convergent-divergent nozzles (of nominal design Mach numbers 1.4, 1.7, and 2.0).

The values of the parameter T_J/T_o chosen for this test program are also identical to those utilized in the mixing noise tests. The four nominal values of T_J/T_o are

$$T_J/T_o = \text{unheated (i.e. } T_R/T_o = 1),\ 1.00,\ 1.82, \text{ and } 2.27.$$

For unheated tests (TP's 1 through 11), the contribution of the broadband shock-associated noise relative to the contribution from mixing noise (which, for fixed pressure ratio, increases with increasing temperature due to the increase in jet exit velocity) to the total sound field is at a maximum, and therefore the variation of shock-associated noise with P_R/P_o can be highlighted accurately. The test points (12 through 22) at isothermal jet operating conditions provide minimum effects of temperature, and hence form a base line for studying the effects of temperature on shock-associated noise. Finally, test points 23 through 44 provide data at high temperatures.

To summarize, the experimental program chart for shock-associated noise readily provides all the information relevant to this phase of the experimental program. Taken together with the results of the turbulent mixing noise experiments given in Volume III, it is possible to define accurately the jet operating conditions, the observer angles, and the frequencies over which the shock-associated noise dominates over the turbulent mixing noise from a jet exhaust.

MEASUREMENT AND DATA REDUCTION PROCEDURES

In the case of turbulent mixing noise from jet exhausts, the acoustic spectrum is broadband, and the time-averaged spectrum is smooth over the frequency range of interest. One-third octave analysis with sufficient time constant is therefore adequate for obtaining accurate frequency analysis of the sound field. However, when a convergent nozzle is operated at supercritical pressure ratios or when a convergent-divergent nozzle is operated at off-design (under-expanded or over-expanded jet flows) pressure ratios, the resulting acoustic spectrum contains a broadband shock-associated noise contribution and harmonics with well-defined peak frequencies, in addition to the basic mixing noise. (The discrete component, or "screech," is not discussed here since, as mentioned earlier, it has been suppressed in the present experiments.) The intensity, and more importantly, for frequency analysis considerations, the bandwidth of this shock-associated noise contribution varies with the nozzle operating conditions and the observer angle. One-third octave analysis is therefore not adequate for an accurate study of the measured shock-associated noise phenomena, although it is also true that whenever the bandwidth of the broadband peak is fairly large, one-third octave analysis provides all the necessary information in such cases. In view of this important consideration, the acoustic measurement and data reduction procedures that were adopted in the present shock-associated test program are as follows.

The signals from the twelve microphones were recorded simultaneously on a 14-channel Honeywell FM tape recorder at 120 inches per second (ips), and during the subsequent frequency analysis, the tape was played back at the reduced speed of 30 ips. For the present 2-inch diameter nozzle, the effective frequency range of interest is from 1 KHz to 40 KHz. With reduced tape speed, the spectra were therefore analyzed from 250 Hz to 10 KHz.

The analysis was conducted with a constant filter bandwidth, B, of 50 Hz, which is equivalent to an effective filter bandwidth of 200 Hz over the required frequency range.

The values of remaining analysis parameters were optimized with two considerations in mind: (i) the statistical accuracy of the data analysis, and (ii) the time taken to perform one spectrum analysis. The number of degrees of freedom, n, was set equal to 100. This means that the true mean-square value, with 98% confidence level, lies between 1.5 times observed mean-square value and 0.75 times observed mean-square value. Expressed in terms of the familiar decibel scale, the true mean-square value is within +1.76 dB and -1.25 dB of the observed mean-square value, with 98% confidence. Of course, the deviation between the true and observed mean-square values will be smaller if a less accurate confidence level is chosen.

Once the value for the number of degrees of freedom was selected, the values of the remaining analysis parameters followed automatically, according to standard statistical data analysis techniques.

The ideal time constant, RC, is n/4B, i.e. 0.5 second. However, in some preliminary data analysis exploration, it was found that a time constant of 1 second was more appropriate in the present (broadband) analysis. With this larger time constant, the spectrum from the X-Y plotter was easier to read

(i.e., it reduced the large pen movements that existed with a 0.5 second time constant), and hence, a time constant of one second was used in all frequency analysis.

The minimum tape loop length in seconds, T, is twice the ideal RC, which in this case corresponds to 1 second (or 30 inches in length). Since the analysis time would be relatively large, it was decided to make tape loops of approximately 120 inches in order to reduce tape wear.

The sweep rate, SR, must be less than B/2T, which in this case is a linear sweep rate of 25 cycles per second. This rate was used at all times.

It is interesting to note that the total analysis time is $A_t = [f(max) - f(min)]/SR$, which is approximately 6½ minutes per spectrum. During each narrowband spectrum analysis, a simultaneous one-third octave band analysis was also conducted, which required no additional analysis time. The resulting one-third octave spectra were processed on the Univac 418 computer with the existing data reduction program, which incorporates the atmospheric attenuation corrections and computes the overall SPL for each spectrum.

DATA PRESENTATION

The nominal values of jet operating conditions defining the test points covering the entire experimental program are tabulated in detail, and the various parameters are defined in the list of symbols. It can be seen that for every test point number (TPN), there are two corresponding run numbers (RN); the first run number refers to measurements in the rear arc, whereas the second run number refers to measurements in the forward arc Although, in the experimental program, the microphones were located at 7½° intervals over the angular range from 15° to 150° to the downstream jet axis, the narrowband spectra given in this Volume are at 15° intervals, simply to reduce the size of the Volume. Each one of the four hundred spectra is identified by the code number that appears on the top right-hand corner. The identification is constructed as follows:

TPN/RN/R or F/θ°

The first number gives the test point number (TPN), and the second number gives the run number (RN). This is followed by the letter R or F, which signifies that the measurements were conducted in the rear arc or the forward arc configuration, respectively. The last number gives the angular position of the microphone, referenced to the jet exhaust axis.

It should be noted that all data given here are for a two-inch diameter convergent nozzle with the measurement points at 72 diameters. For application to other measurement configurations, the normal scaling laws must be applied.

Finally, the reader is made aware of the point that due to the presence of the kaowool wrapping near the nozzle exit, there is no direct line of sight between the 150° microphone position and the nozzle lip. The spectra at this microphone angle are therefore likely to be affected (normally resulting into

slightly lower levels than expected), and should be treated with caution. No such problem exists, however, for results at angles smaller than approximately 135°.

SHOCK ASSOCIATED NOISE EXPERIMENTS

TEST POINT CONDITIONS
(NOMINAL)

LIST OF SYMBOLS

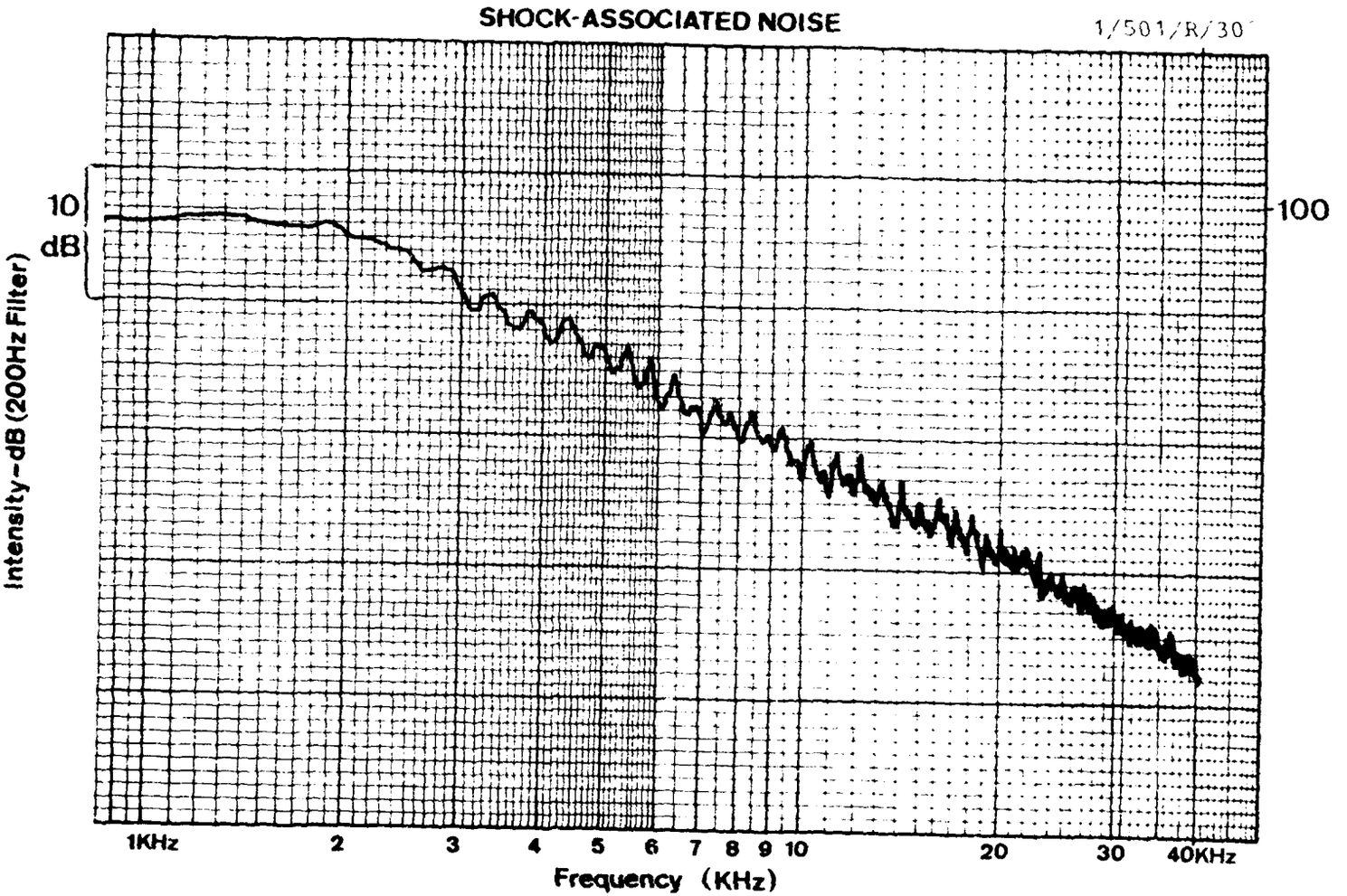
a_o	ambient speed of sound
a_J	speed of sound in jet flow at nozzle exit plane
D	jet nozzle diameter
M_J	jet Mach number, V_J/a_J
P_R/P_o	pressure ratio
R	microphone distance from nozzle exit plane
RN	run number
TPN	test point number
T_J/T_o	static (or jet exit) temperature ratio
T_R/T_o	stagnation (or total) temperature ratio
V_J/a_o	jet exit velocity ratio
	$= (M_J^2 - 1)^{\frac{1}{2}}$
	ratio of specific heats
	microphone angle relative to downstream jet axis

TPN	β	T_J/T_o	M_J	V_J/a_o	γ	P_R/P_o	T_R/T_o	REAR ARC		FORWARD ARC	
								RN	PAGE NO.	RN	PAGE NO.
1	0.20	0.828	1.020	0.928	1.40	1.937	1.000	501	13 - 17	545	18 - 22
2	0.30	0.821	1.044	0.946		1.994		502	23 - 27	546	28 - 32
3	0.40	0.812	1.077	0.970		2.076		503	33 - 37	547	38 - 42
4	0.50	0.800	1.118	1.000		2.184		504	43 - 47	548	48 - 52
5	0.60	0.786	1.166	1.034		2.321		505	53 - 57	549	58 - 62
6	0.70	0.700	1.221	1.071		2.491		506	63 - 67	550	68 - 72
7	0.80	0.753	1.281	1.111		2.699		507	73 - 77	551	78 - 82
8	0.94	0.726	1.372	1.170		3.062		508	83 - 87	552	88 - 92
9	1.10	0.693	1.487	1.238		3.601		509	93 - 97	553	98 - 102
10	1.34	0.641	1.672	1.339	1.40	4.732	1.000	510	103 - 107	554	108 - 112

TPN		T_J/T_o	M_J	V_J/a_o		P_R/P_o	T_R/T_o	REAR ARC		FORWARD ARC	
								RN	PAGE NO.	RN	PAGE NO.
12	0.20	1.000	1.020	1.020	1.40	1.937	1.208	543	113 - 117	556	118 - 122
13	0.30		1.044	1.044	1.40	1.994	1.218	542	123 - 127	557	128 - 132
14	0.40		1.077	1.077	1.40	2.076	1.232	541	133 - 137	558	138 - 142
15	0.50		1.118	1.118	1.40	2.184	1.250	540	143 - 147	559	148 - 152
16	0.60		1.166	1.166	1.39	2.313	1.265	539	153 - 157	560	158 - 162
17	0.70		1.221	1.221	1.39	2.482	1.291	538	163 - 167	561	168 - 172
18	0.80		1.281	1.281	1.39	2.688	1.320	537	173 - 177	562	178 - 182
19	0.94		1.372	1.372	1.39	3.050	1.367	536	183 - 187	563	188 - 192
20	1.10		1.487	1.487	1.39	3.586	1.431	535	193 - 197	564	198 - 202
21	1.34	1.000	1.672	1.672	1.39	4.715	1.545	534	203 - 207	565	208 - 212

TPN	β	T_J/T_o	M_J	V_J/a_o	γ	P_R/P_o	T_R/T_o	REAR ARC		FORWARD ARC	
								RN	PAGE NO.	RN	PAGE NO.
23	0.20	1.820	1.020	1.376	1.37	1.919	2.170	532	213 - 217	567	218 - 222
24	0.30	↑	1.044	1.408	1.37	1.974	2.187	531	223 - 227	568	228 - 232
25	0.40		1.077	1.453	1.37	2.054	2.211	530	233 - 237	569	238 - 242
26	0.50		1.118	1.508	1.37	2.160	2.241	529	243 - 247	570	248 - 252
27	0.60		1.166	1.573	1.36	2.287	2.266	528	253 - 257	571	258 - 262
28	0.70		1.221	1.647	1.36	2.454	2.308	527	263 - 267	572	268 - 272
29	0.80		1.281	1.728	1.36	2.657	2.357	526	273 - 277	573	278 - 282
30	0.94		1.372	1.852	1.36	3.013	2.437	525	283 - 287	574	288 - 292
31	1.10	↓	1.487	2.006	1.35	3.529	2.524	524	293 - 297	575	298 - 302
32	1.34	1.820	1.672	2.256	1.35	4.647	2.710	523	303 - 307	576	308 - 312

TPN	B	T_J/T_O	M_J	V_J/a_O	γ	P_R/P_O	T_R/T_O	REAR ARC		FORWARD ARC	
								RN	PAGE NO.	RN	PAGE NO.
34	0.20	2.270	1.020	1.536	1.35	1.906	2.683	512	313 - 317	578	318 - 322
35	0.30	↑	1.044	1.573	1.35	1.961	2.703	513	323 - 327	579	328 - 332
36	0.40		1.077	1.623	1.35	2.040	2.731	514	333 - 337	580	338 - 342
37	0.50		1.118	1.684	1.35	2.145	2.767	515	343 - 347	581	348 - 352
38	0.60		1.166	1.757	1.35	2.278	2.810	516	353 - 357	582	358 - 362
39	0.70		1.221	1.839	1.34	2.435	2.845	517	363 - 367	583	368 - 372
40	0.80		1.281	1.929	1.34	2.636	2.903	518	373 - 377	584	378 - 382
41	0.94		1.372	2.068	1.34	2.989	2.997	519	383 - 387	585	388 - 392
42	1.10	↓	1.487	2.240	1.34	3.515	3.123	520	393 - 397	586	398 - 402
43	1.34	2.270	1.672	2.519	1.33	4.612	3.317	521	403 - 407	587	408 - 412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Intensity-dB (200Hz Filter)
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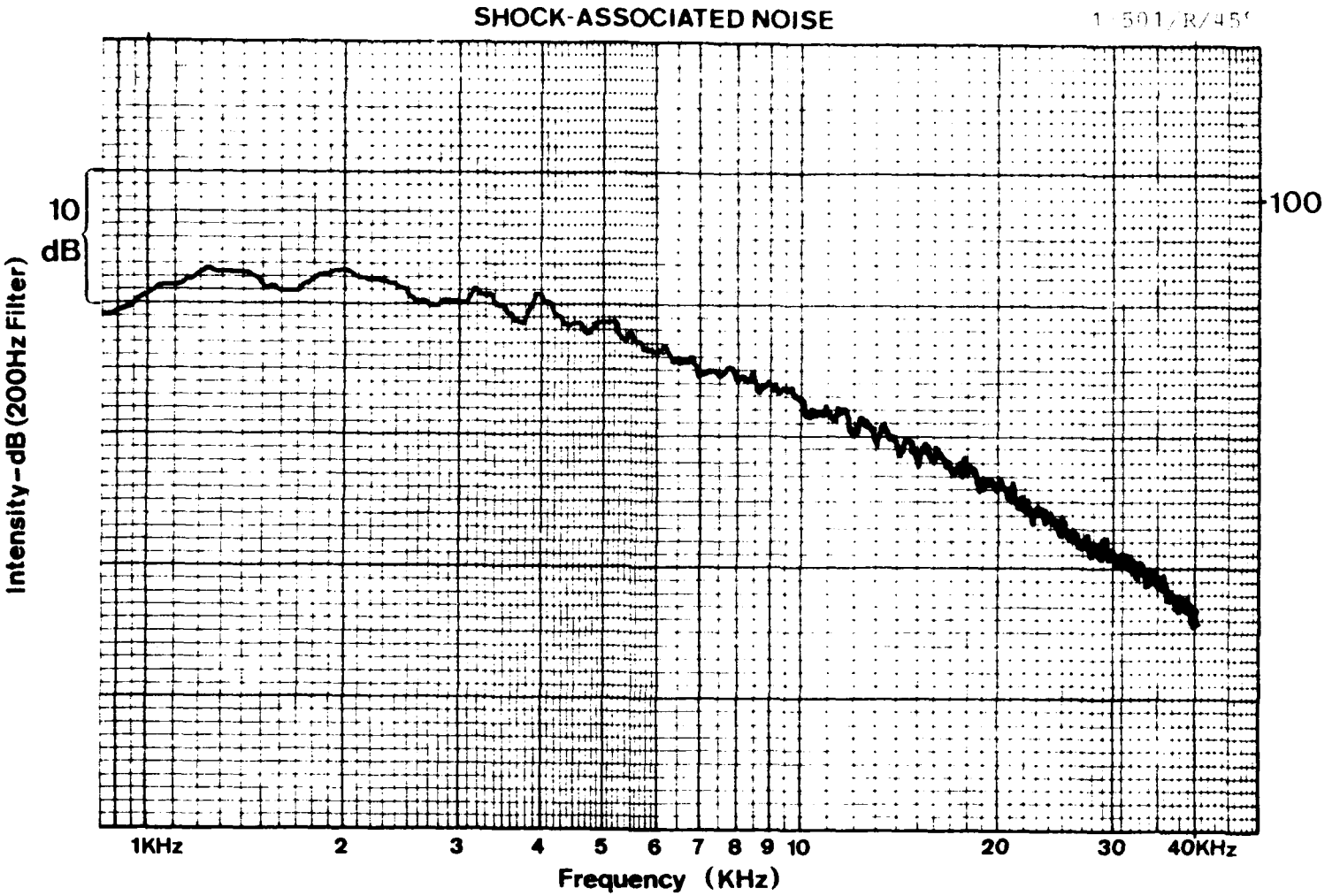
Frequency (KHz)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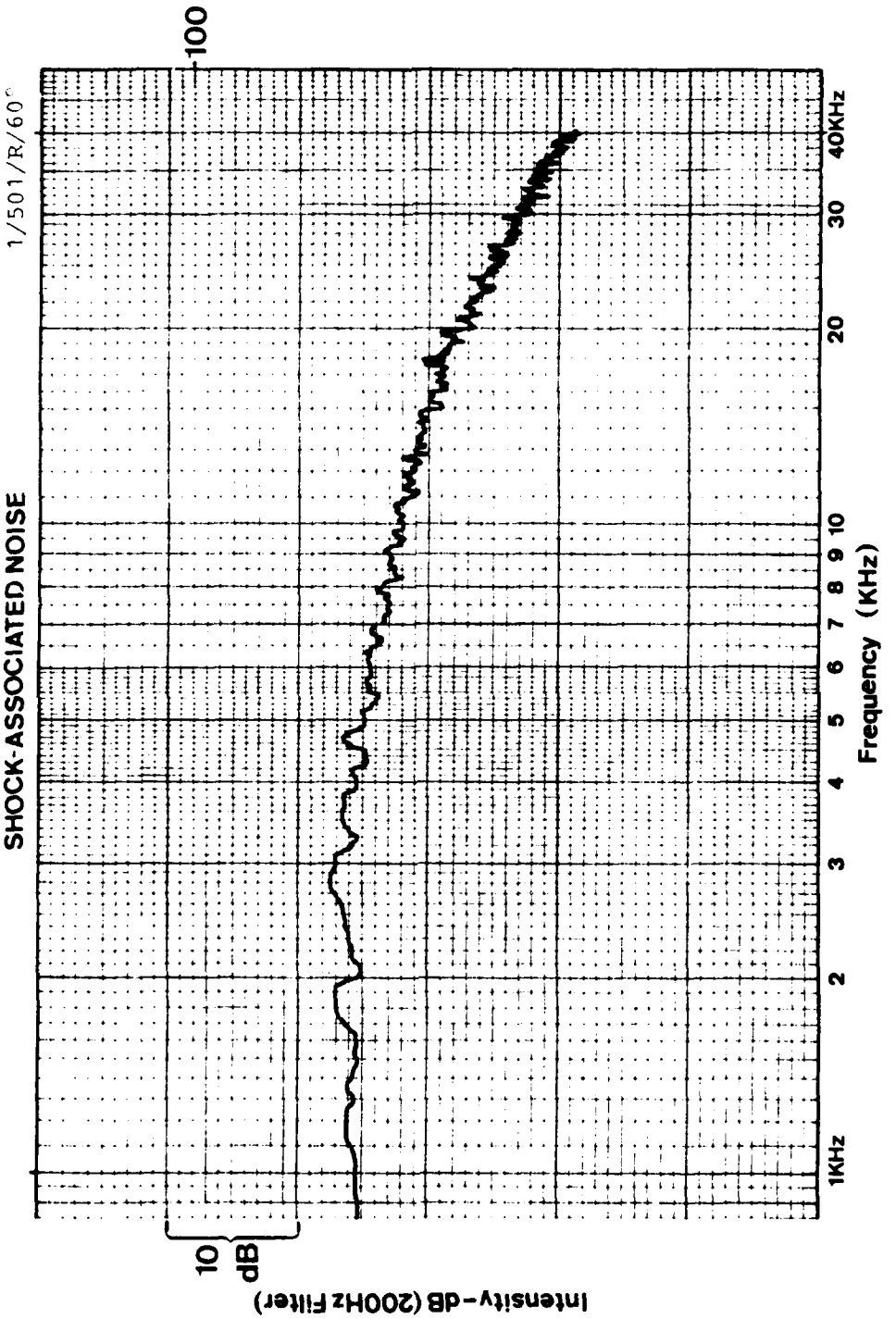
Frequency (KHz)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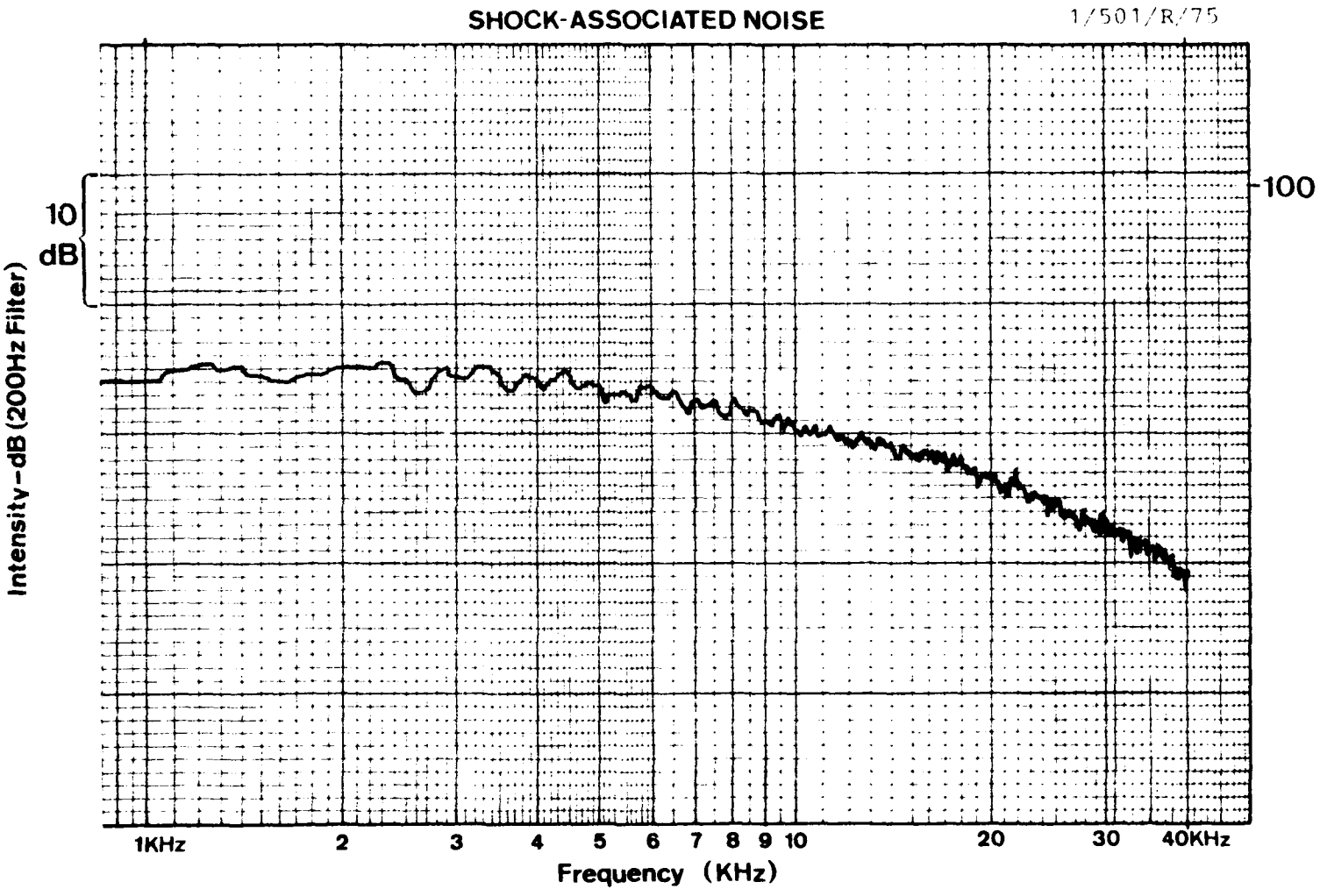
Frequency (KHz)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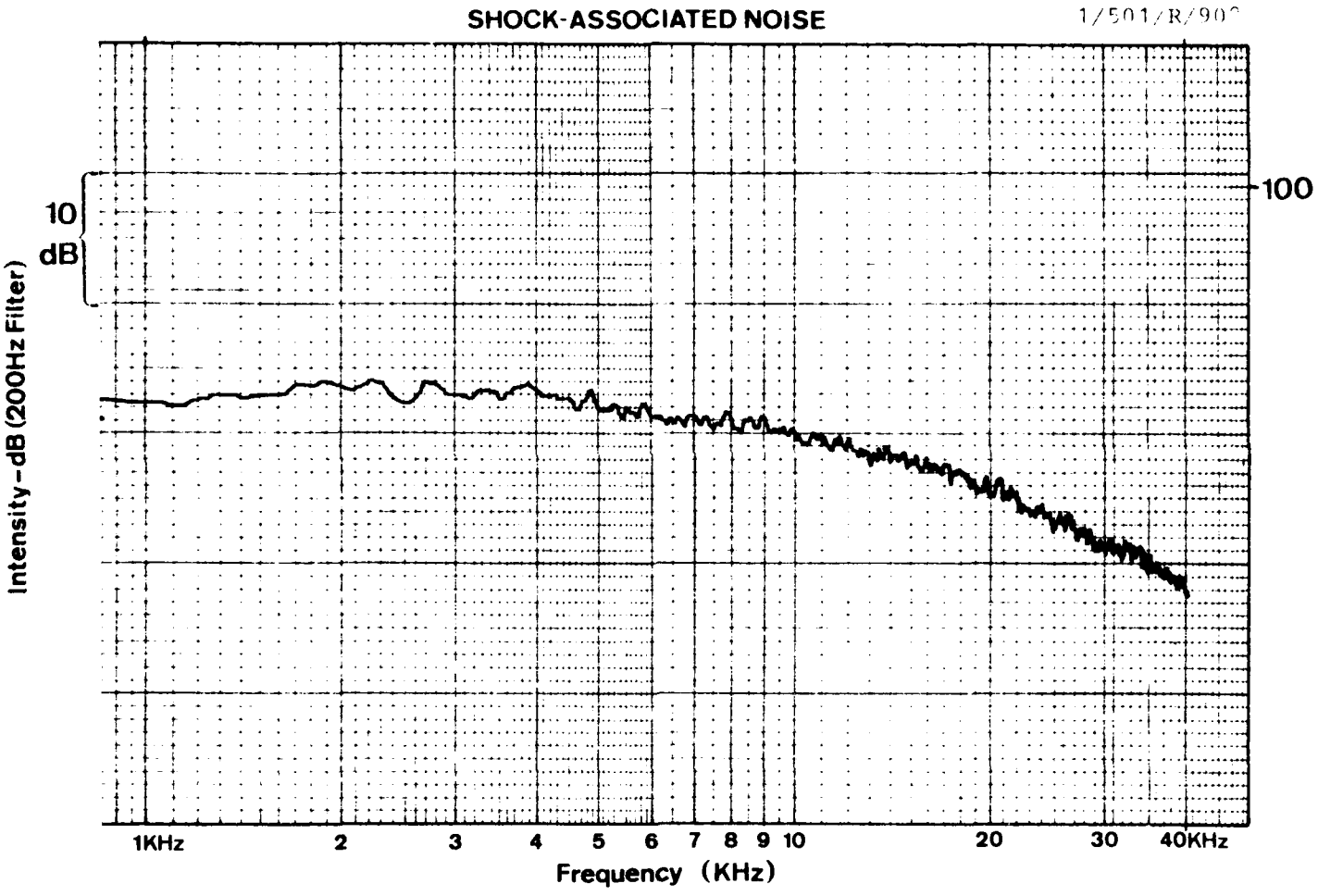
40KHz
Frequency (KHz)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100
Intensity-dB (200Hz Filter)
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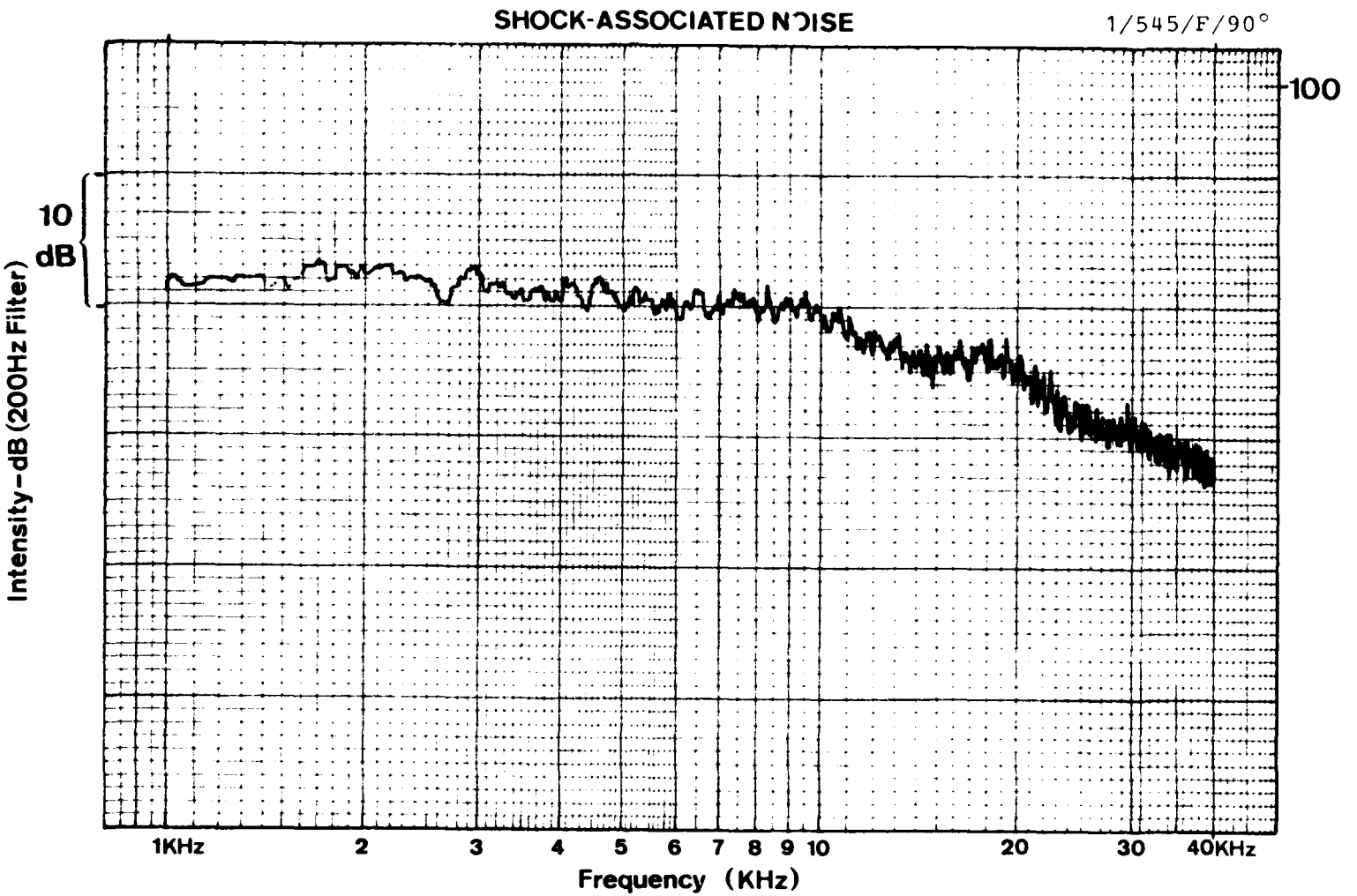
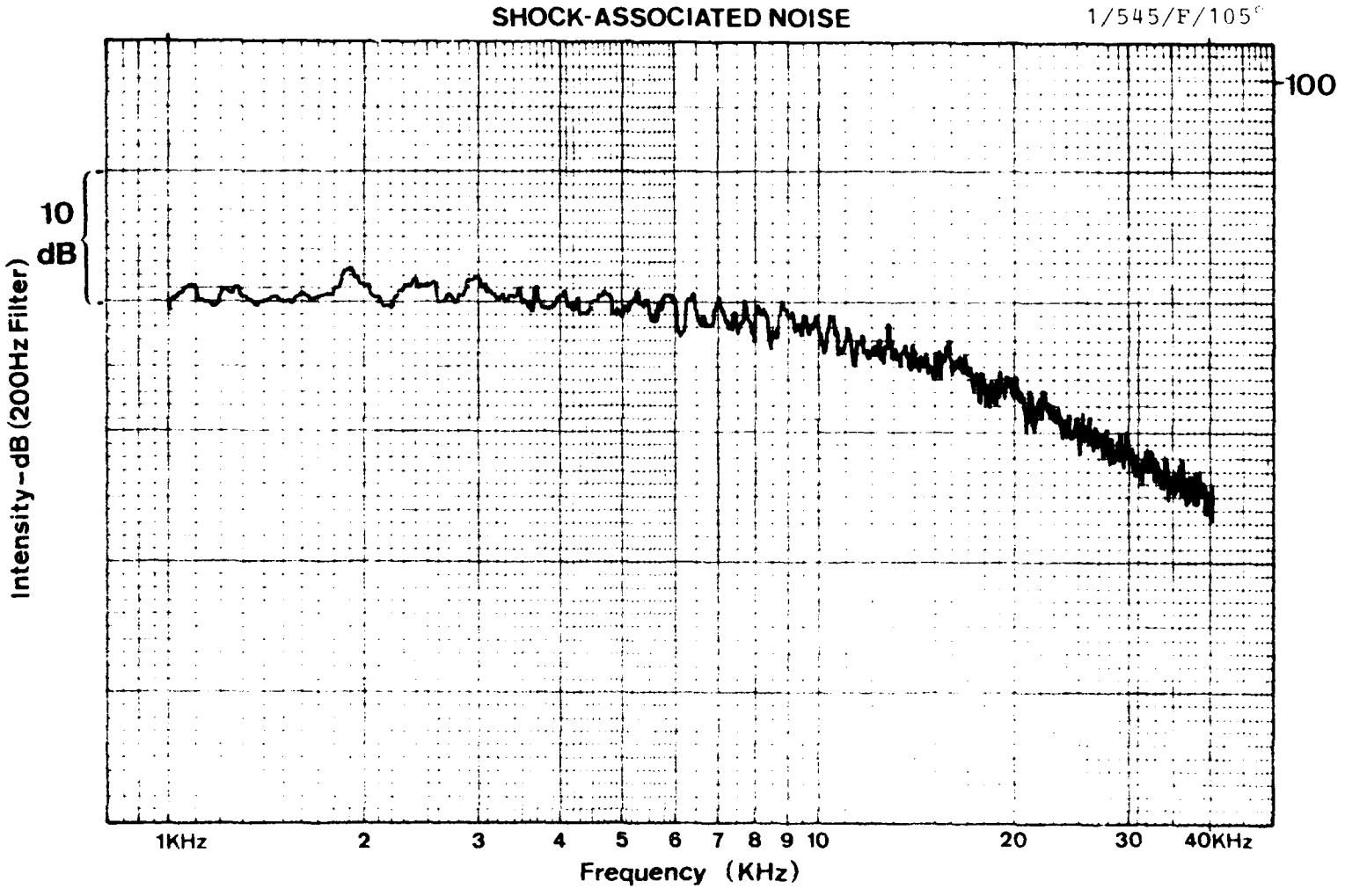
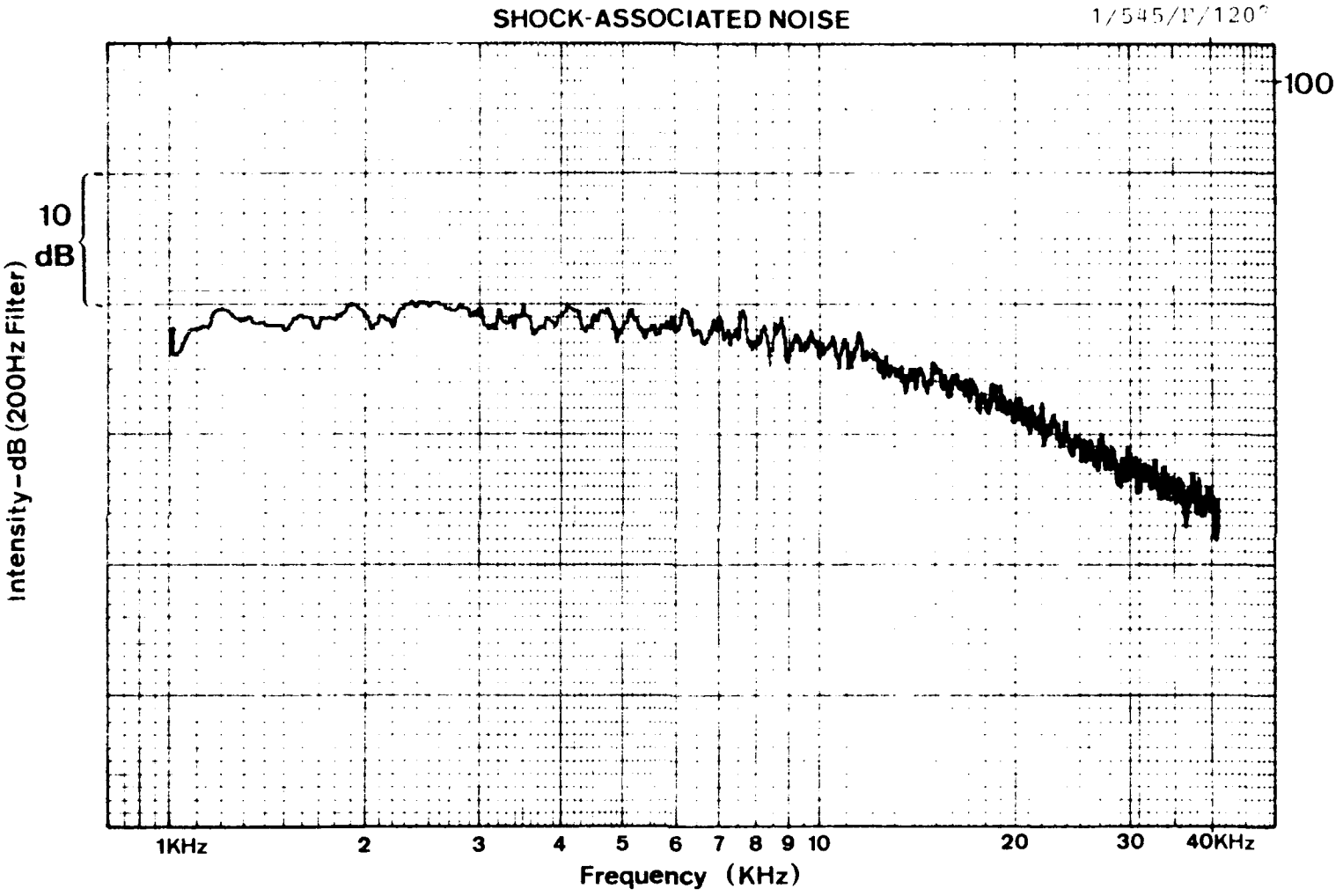
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
1/545/F/90°
100
10
dB
Intensity-dB (200Hz Filter)
1KHz
2
3
4
5
6
7
8
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
1/545/F/105
100
10
dB
Intensity - dB (200Hz Filter)
1KHz
2
3
4
5
6
7
8
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
1/545/P/120°
100
10
dB
Intensity-dB (200Hz Filter)
1KHz
2
3
4
5
6
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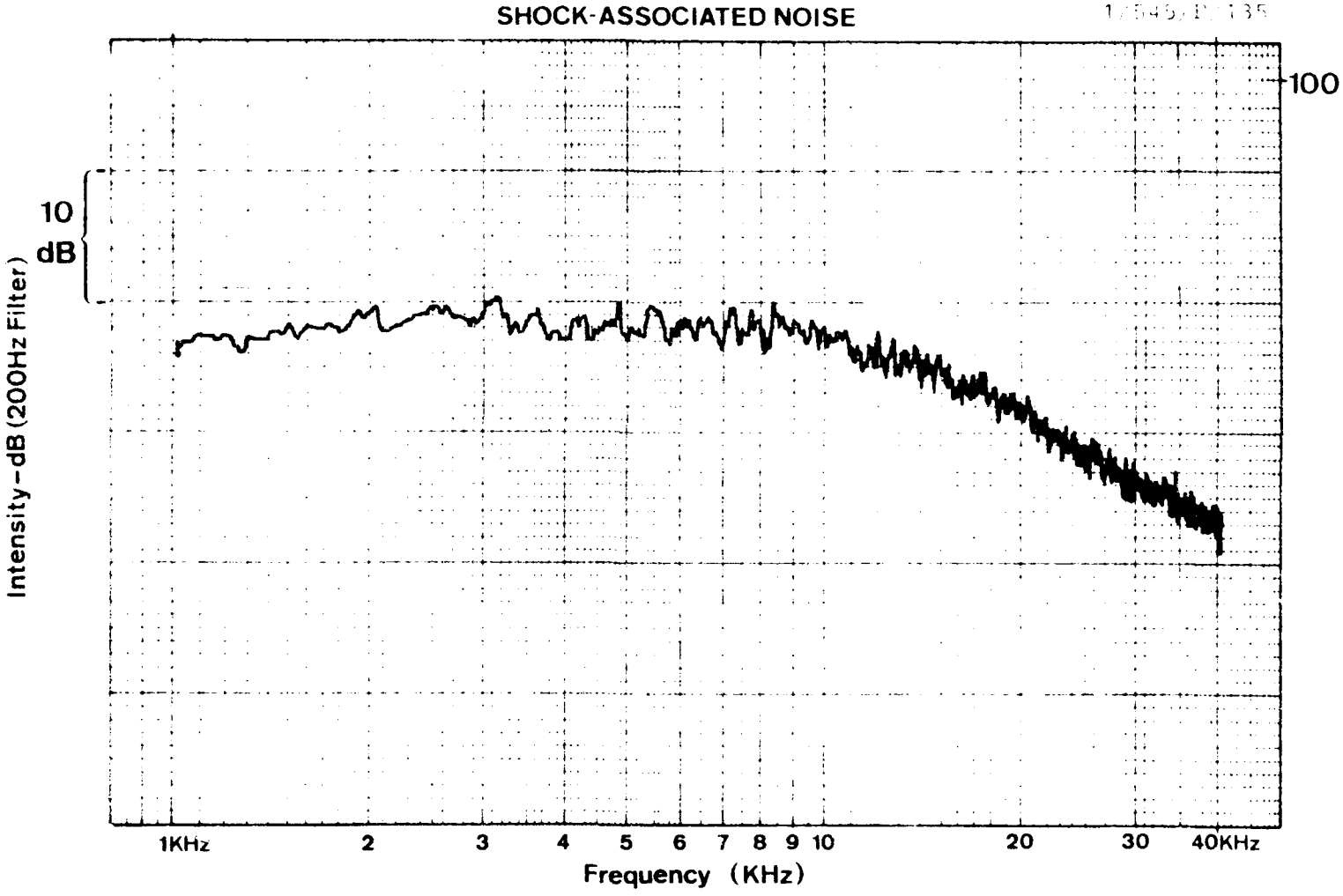
8
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
100
10
dB
Intensity-dB (200Hz Filter)
1KHz
2
3
4
5
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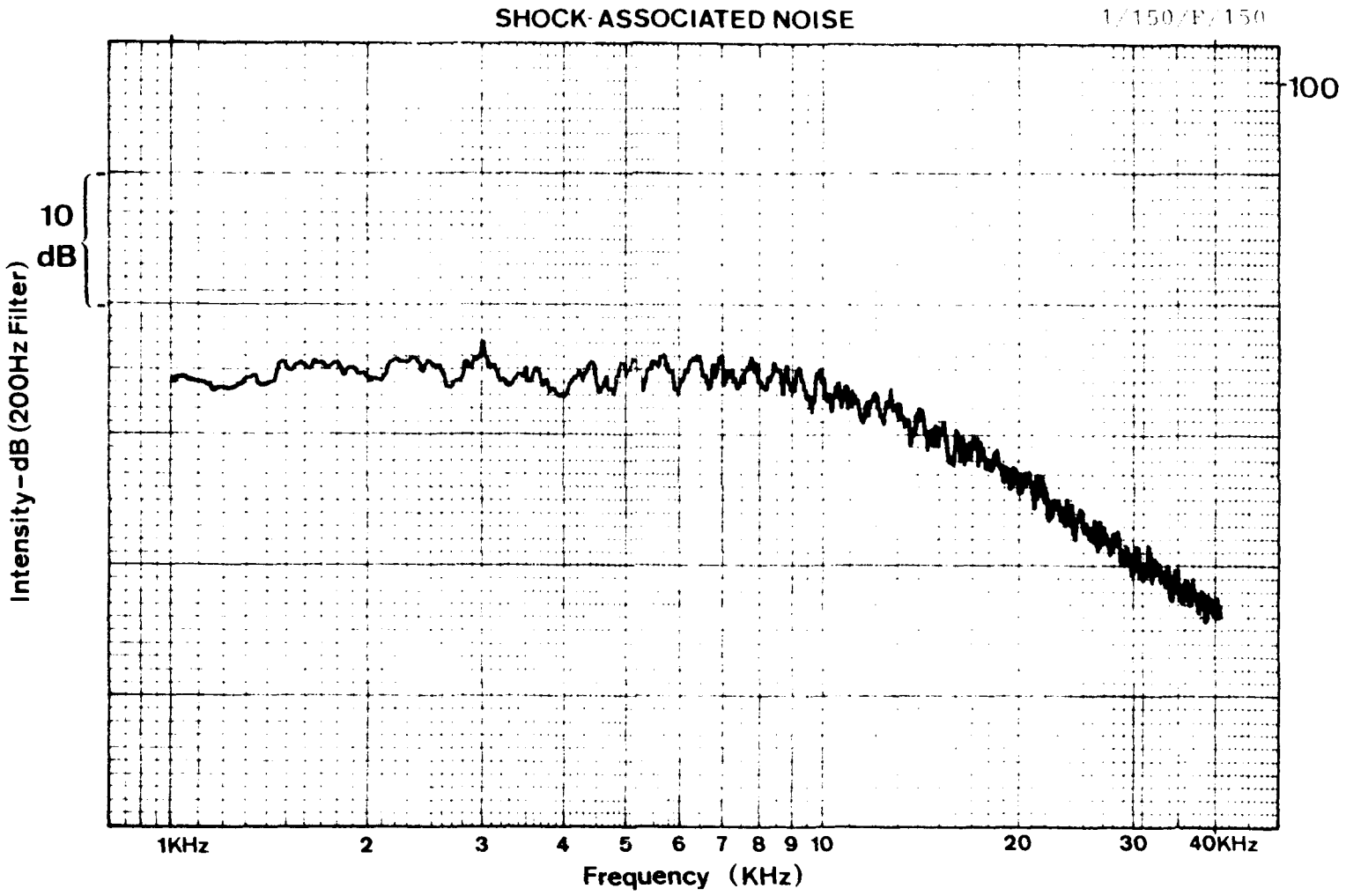
8
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
1/150/F/150
100
10
dB
Intensity-dB (200Hz Filter)
1KHz
2
3
4
5
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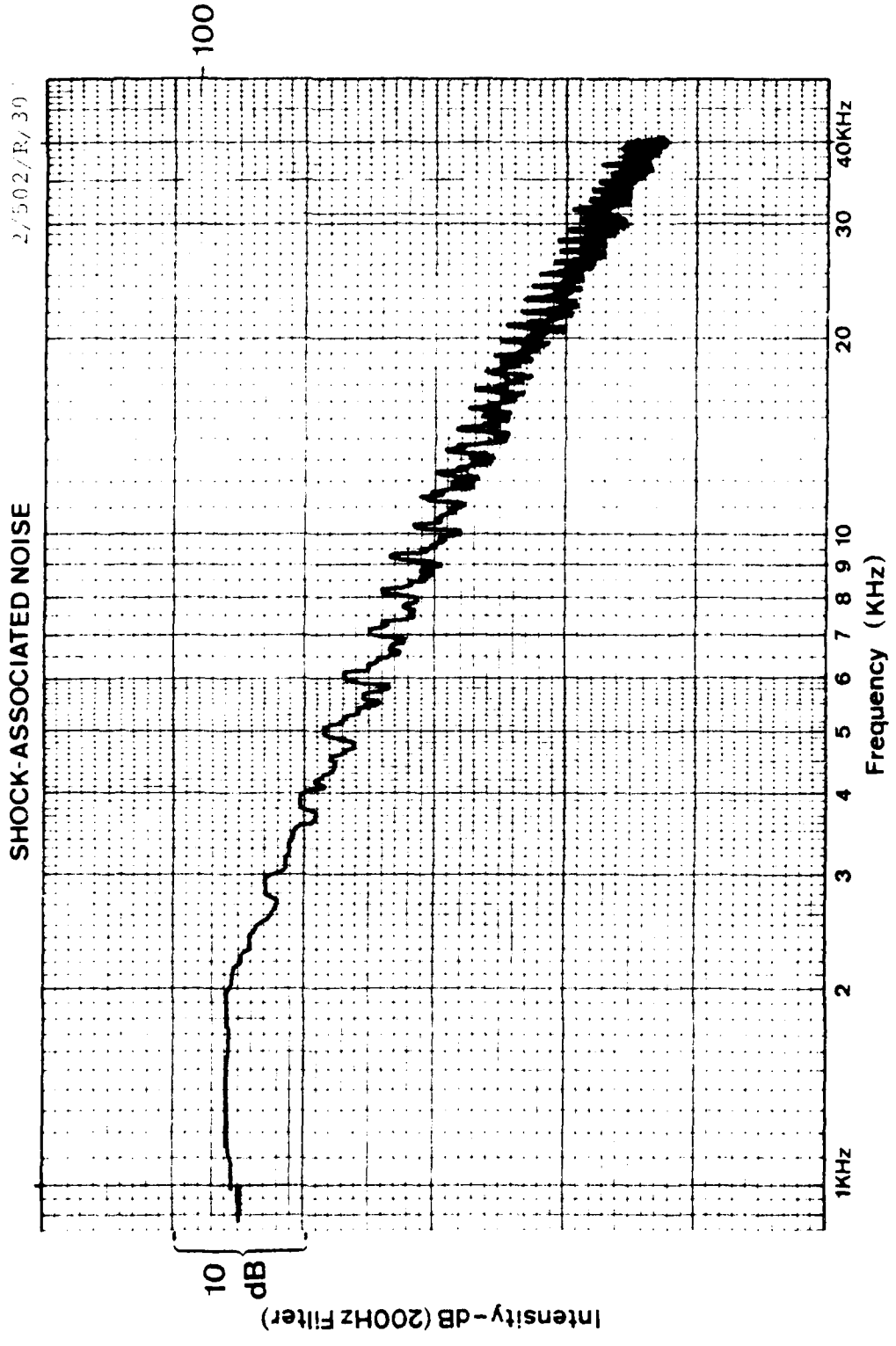
7
8
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
2/502/R/30
100
10 dB
Intensity – dB (200Hz Filter)
1KHz
2
3
4
5
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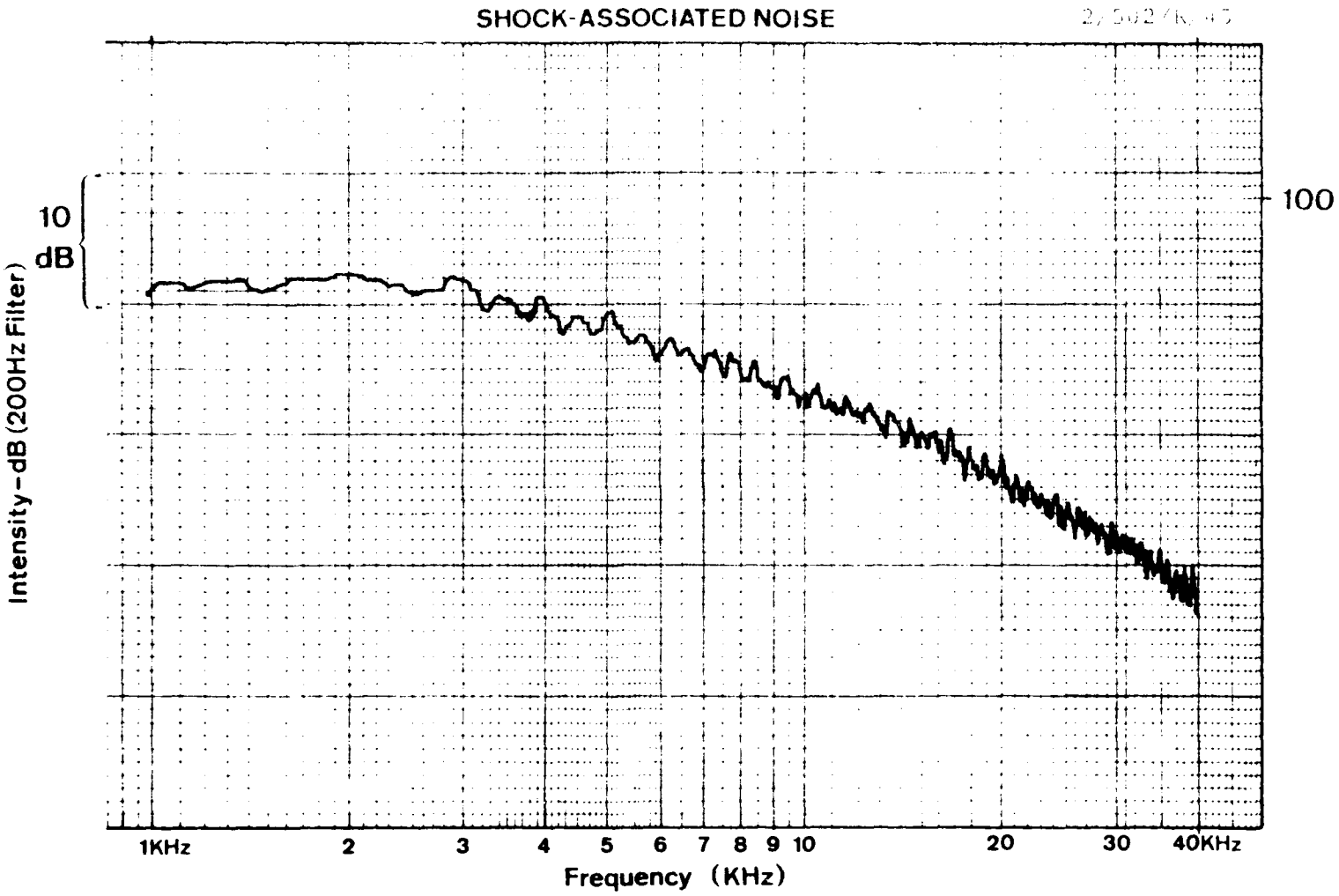
7
8
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
10
dB
100
Intensity-dB (200Hz Filter)
1KHz
2
3
4
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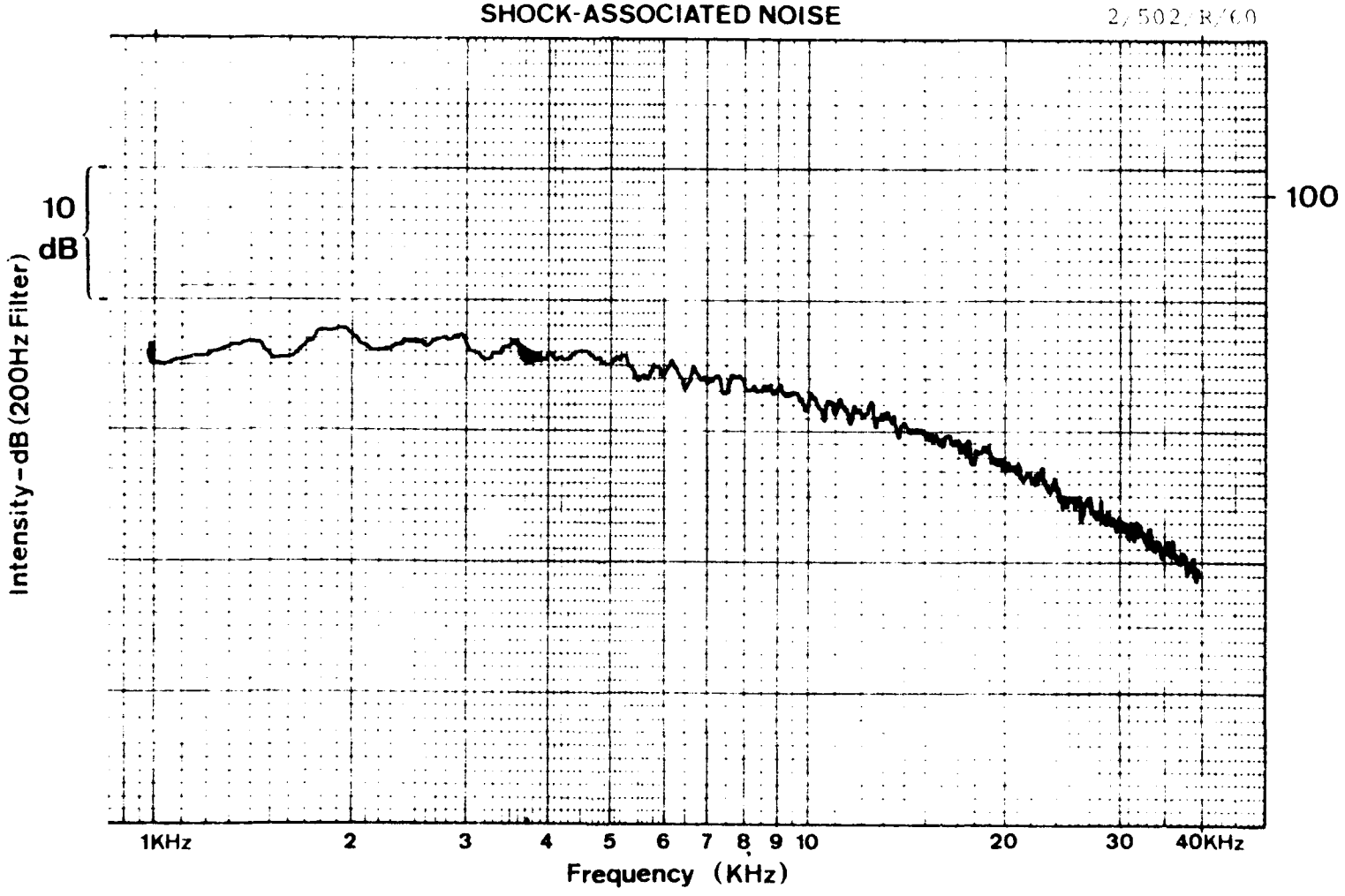
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
2/502/R/60
10
dB
100
Intensity-dB (200Hz Filter)
1KHz
2
3
4
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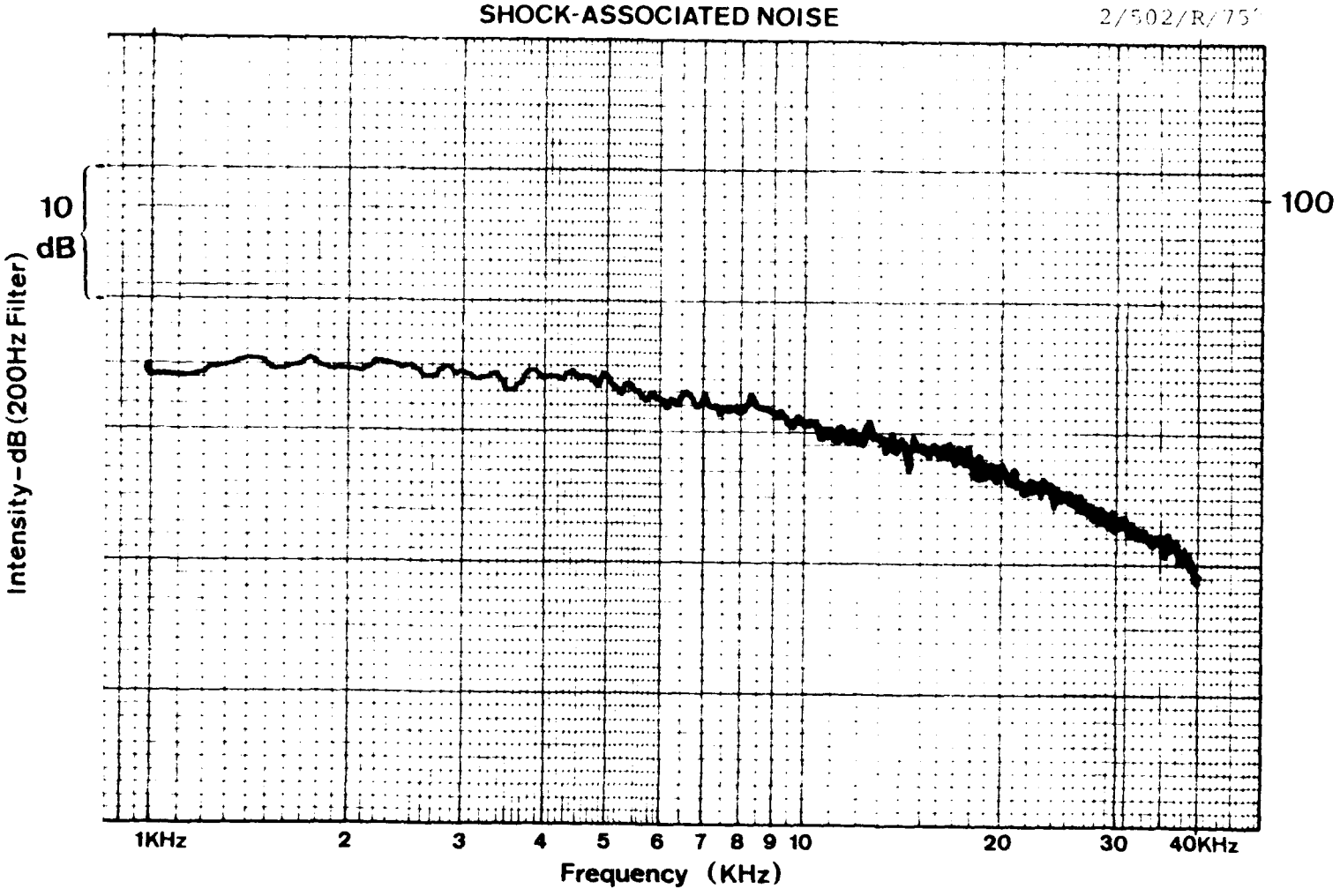
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
2/502/R/75
10
dB
100
Intensity-dB (200Hz Filter)
1KHz
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9
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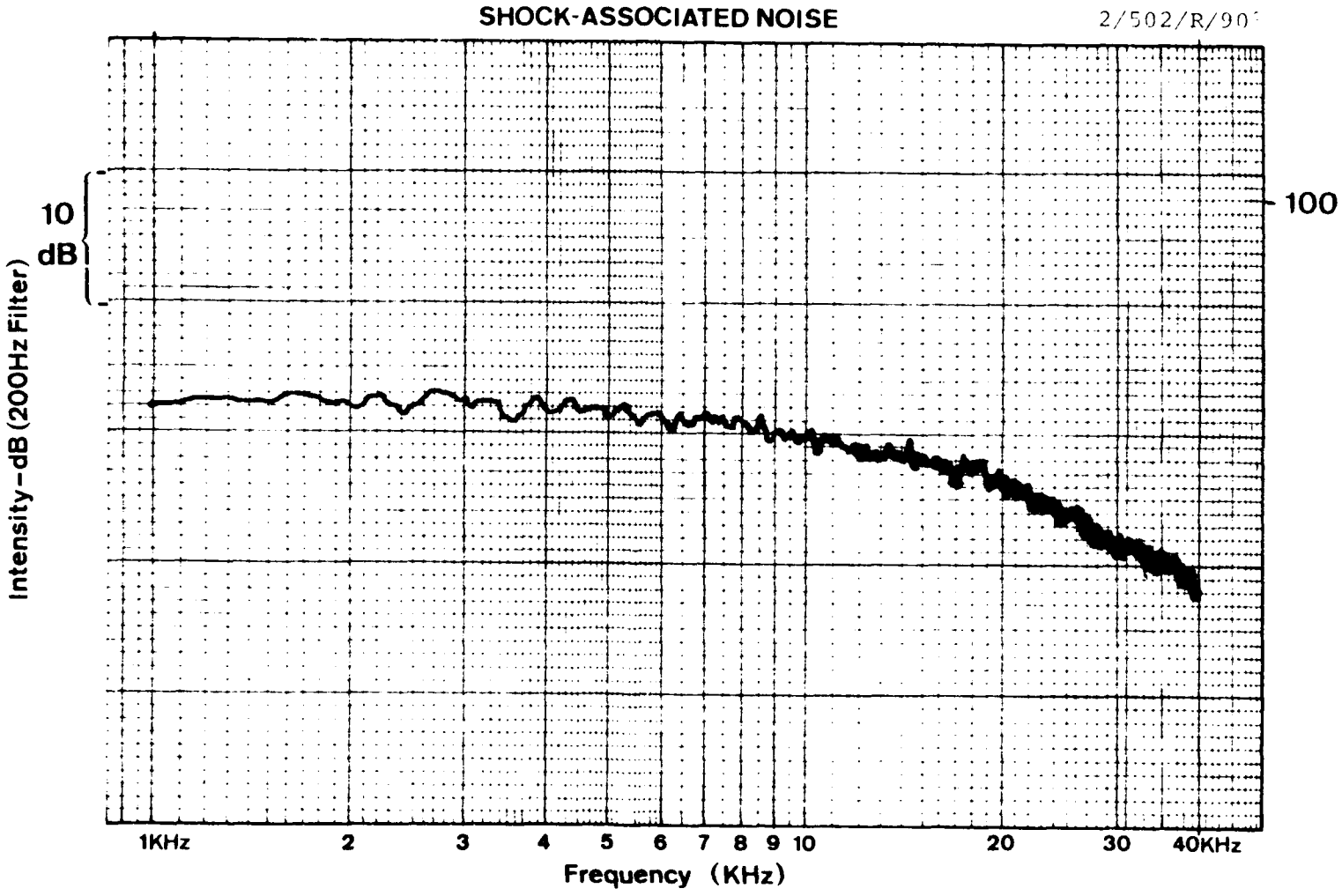
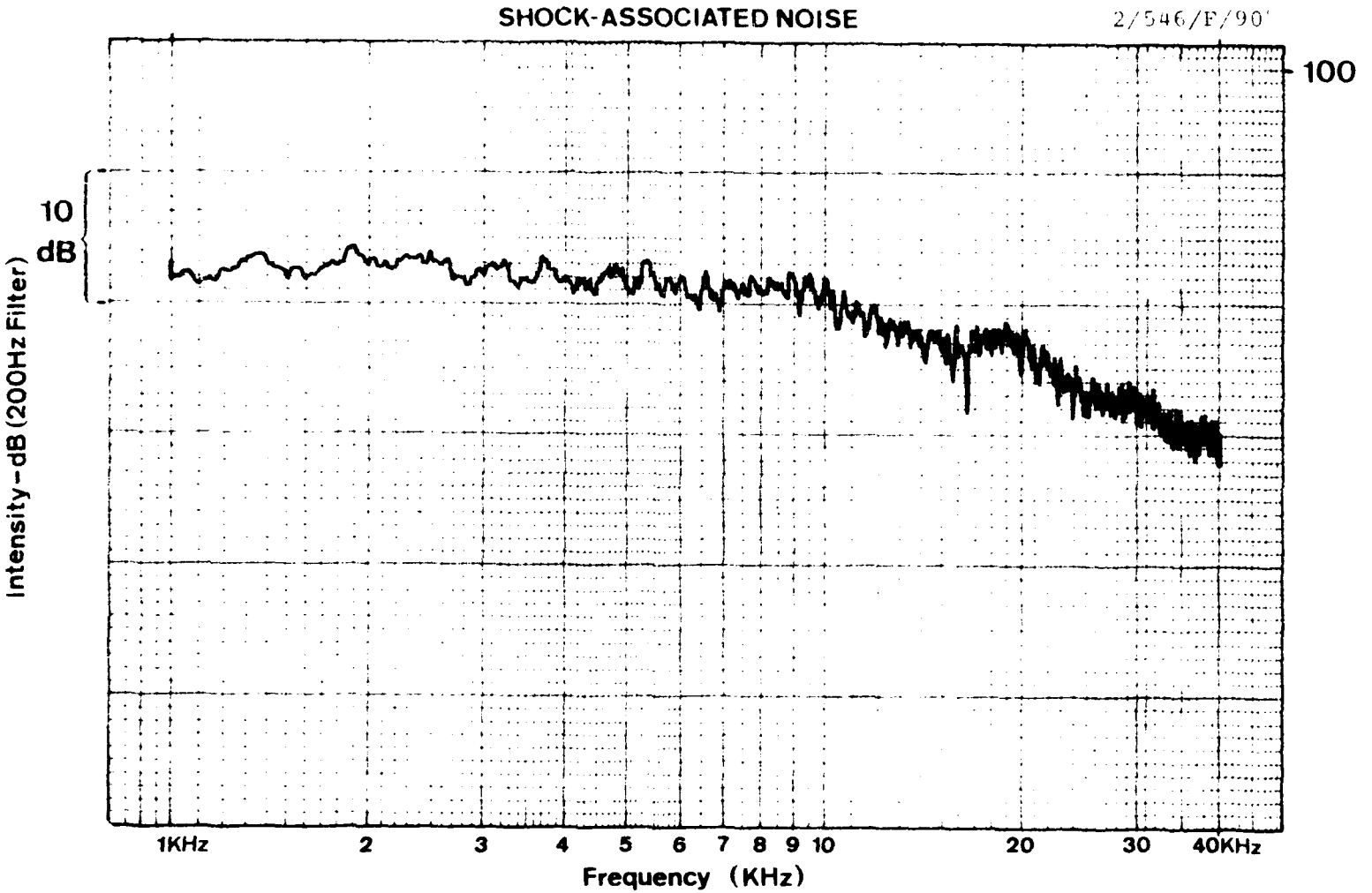
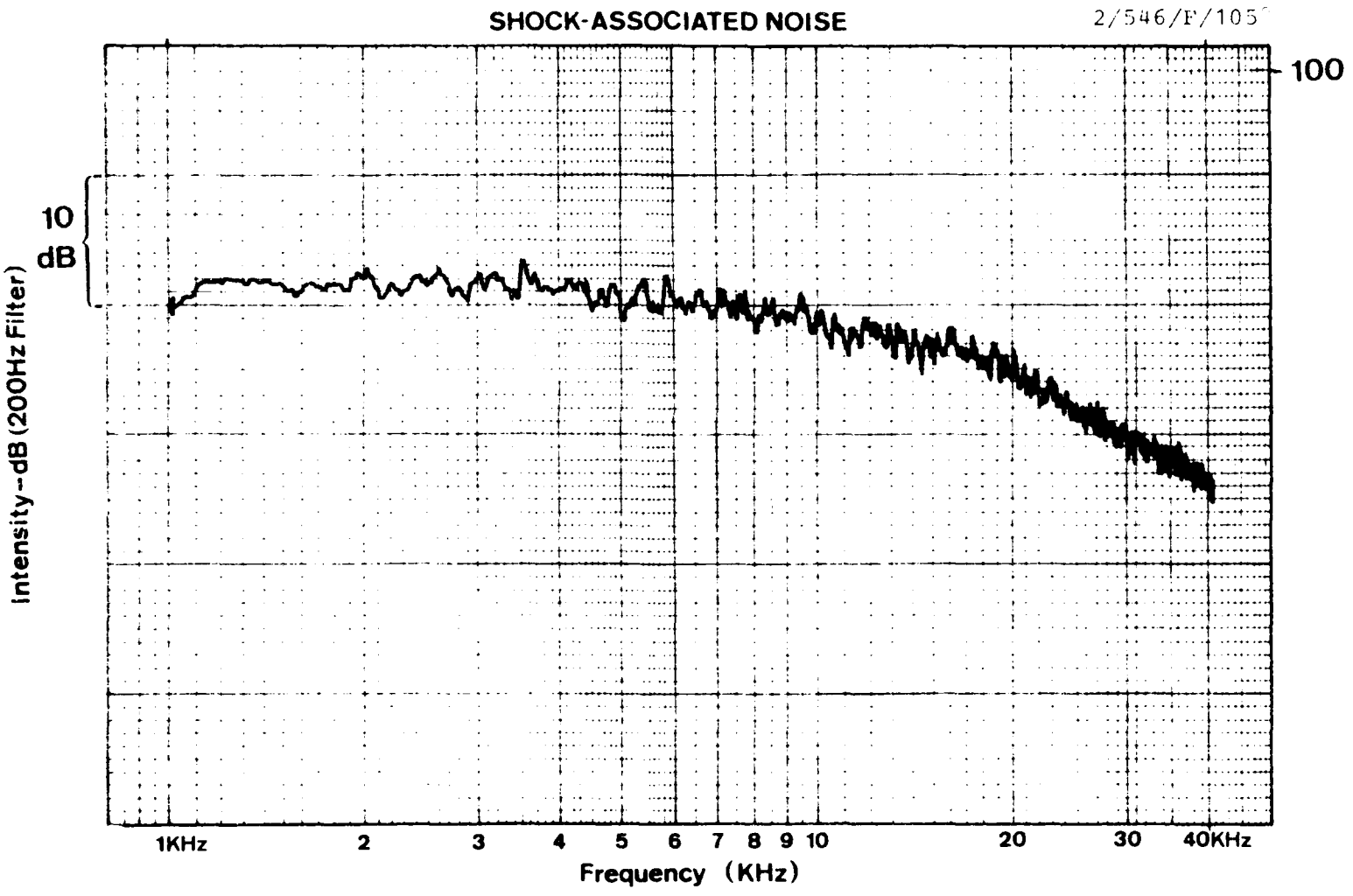
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
2/502/R/90
10
dB
100
Intensity-dB (200Hz Filter)
1KHz
2
3
4
5
6
7
8
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
2/546/F/90'
100
10
dB
Intensity-dB (200Hz Filter)
1KHz
2
3
4
5
6
7
8
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
2/546/F/105
100
10
dB
Intensity--dB (200Hz Filter)
1KHz
2
3
4
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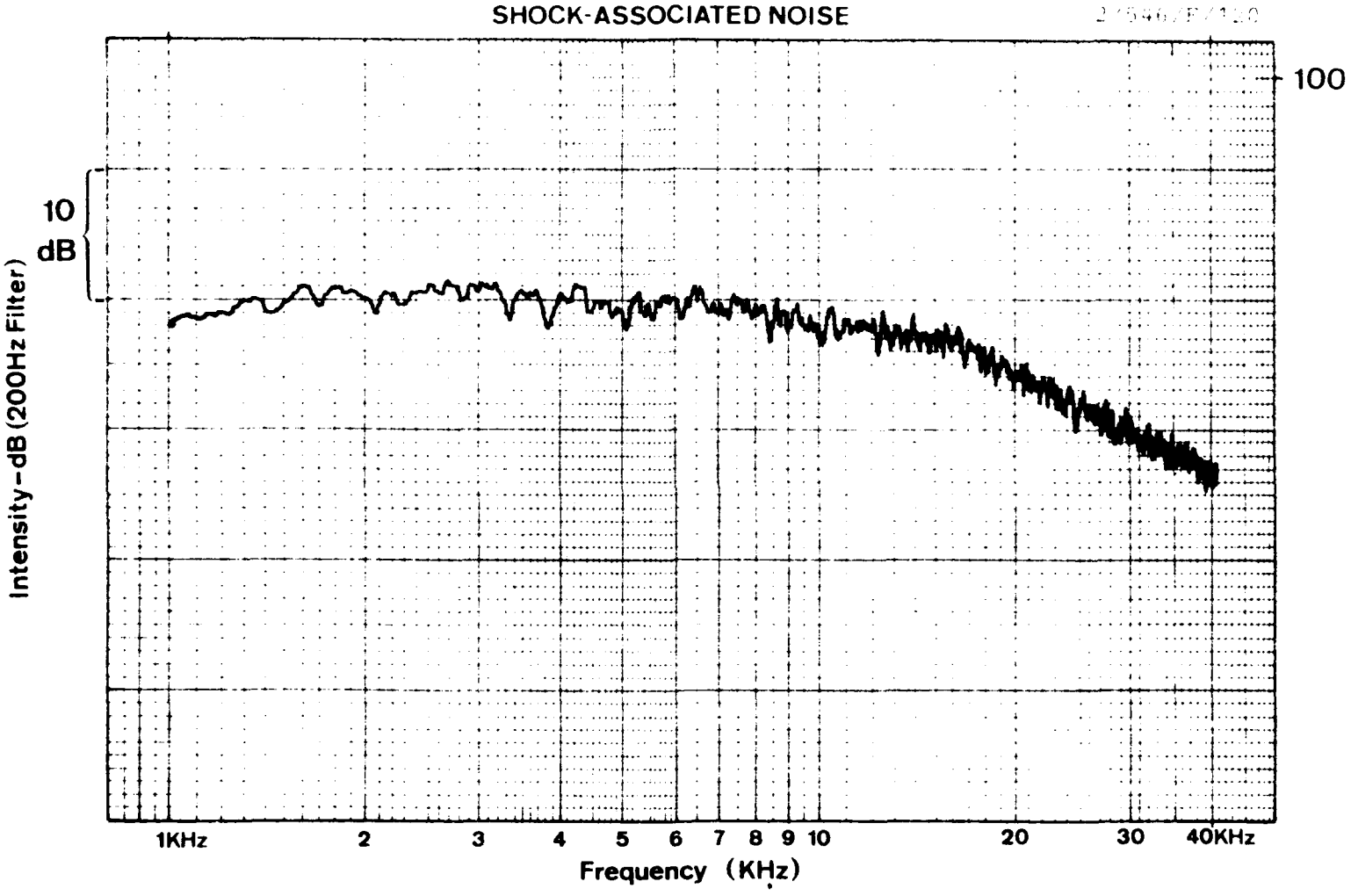
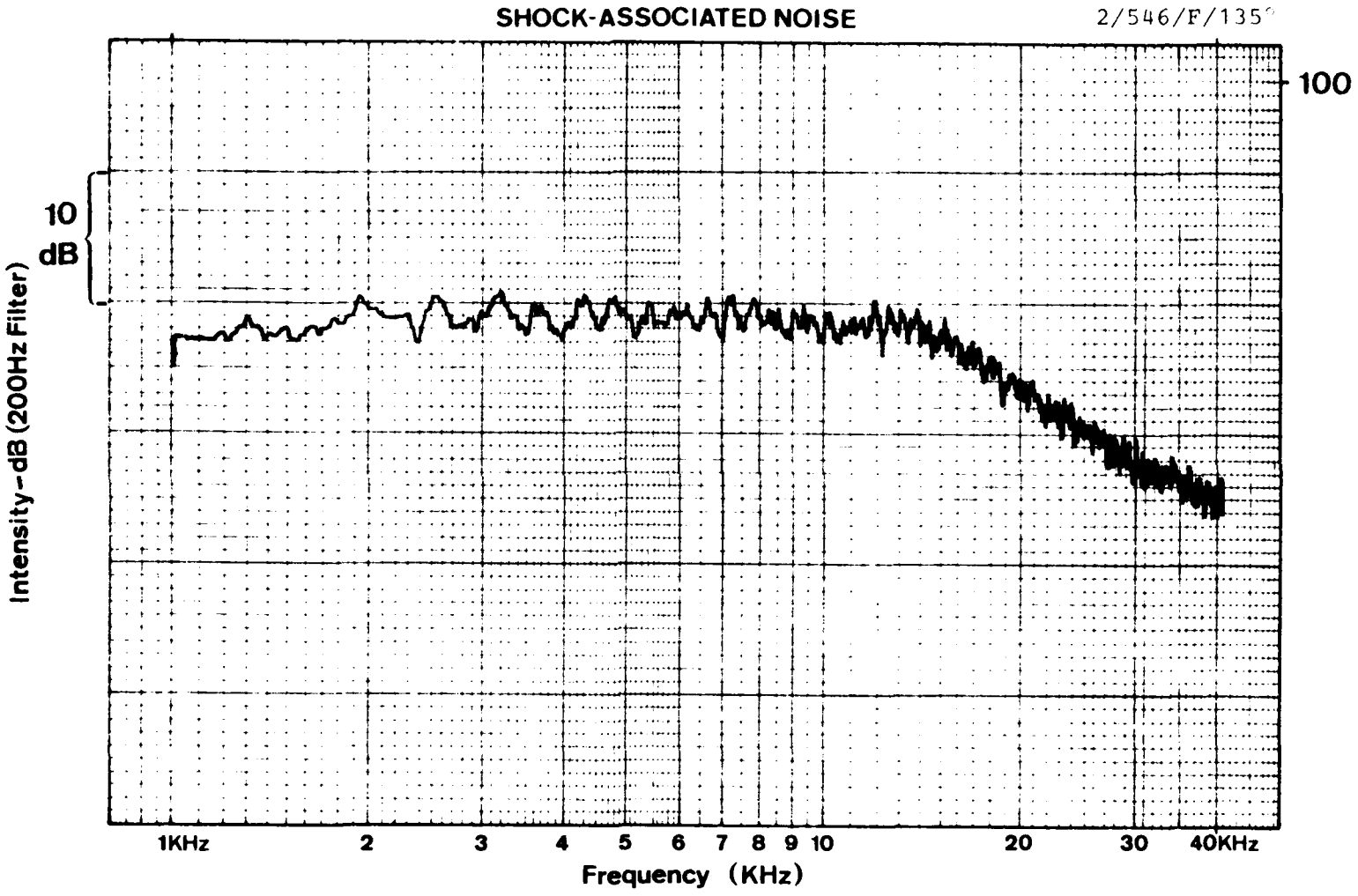
8
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
100
10
dB
Intensity-dB (200Hz Filter)
1KHz
2
3
4
5
6
7
8
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
2/546/F/135°
100
10
dB
Intensity-dB (200Hz Filter)
1KHz
2
3
4
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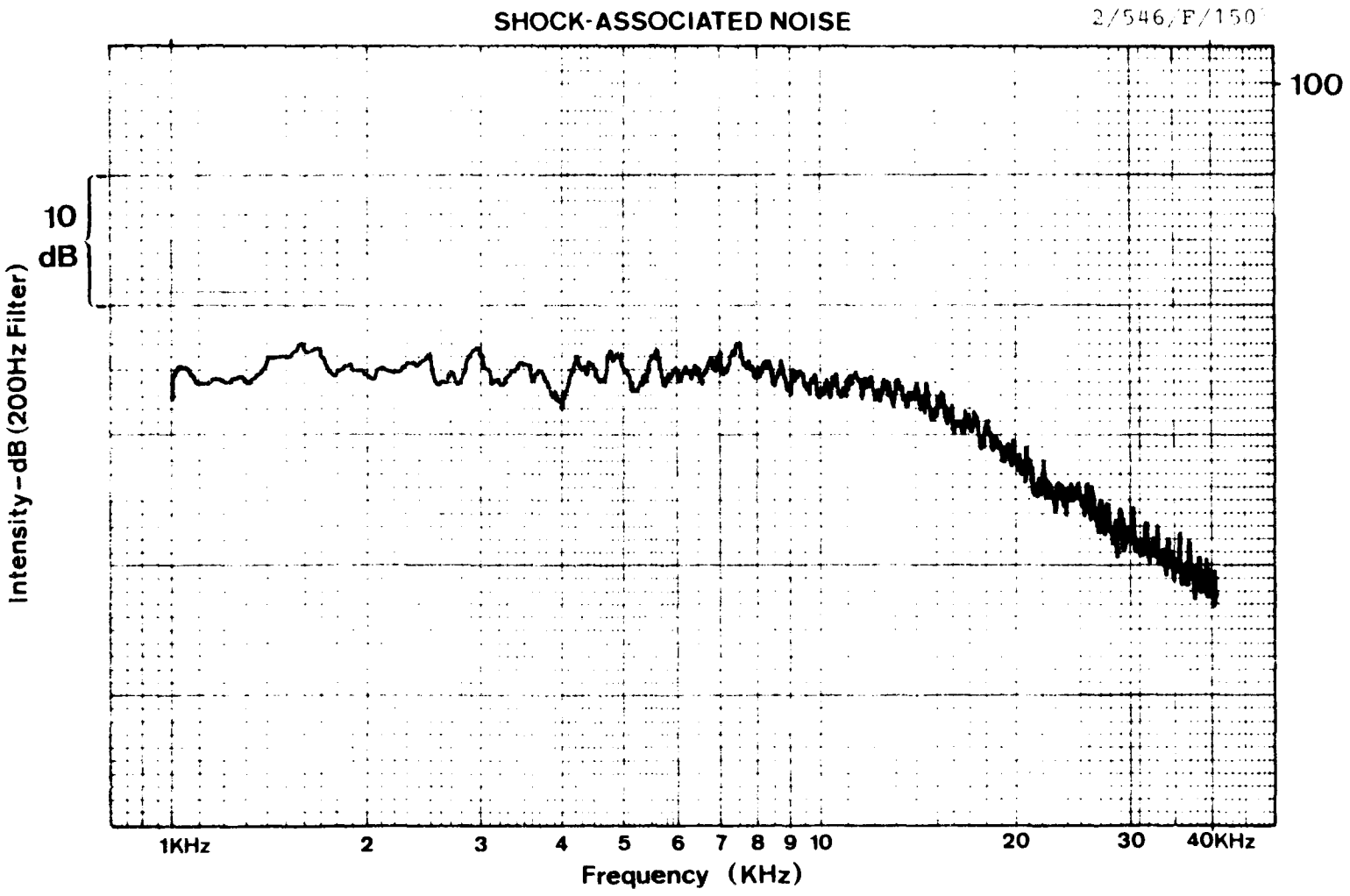
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
2/546/F/150
100
10
dB
Intensity-dB (200Hz Filter)
1KHz
2
3
4
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7
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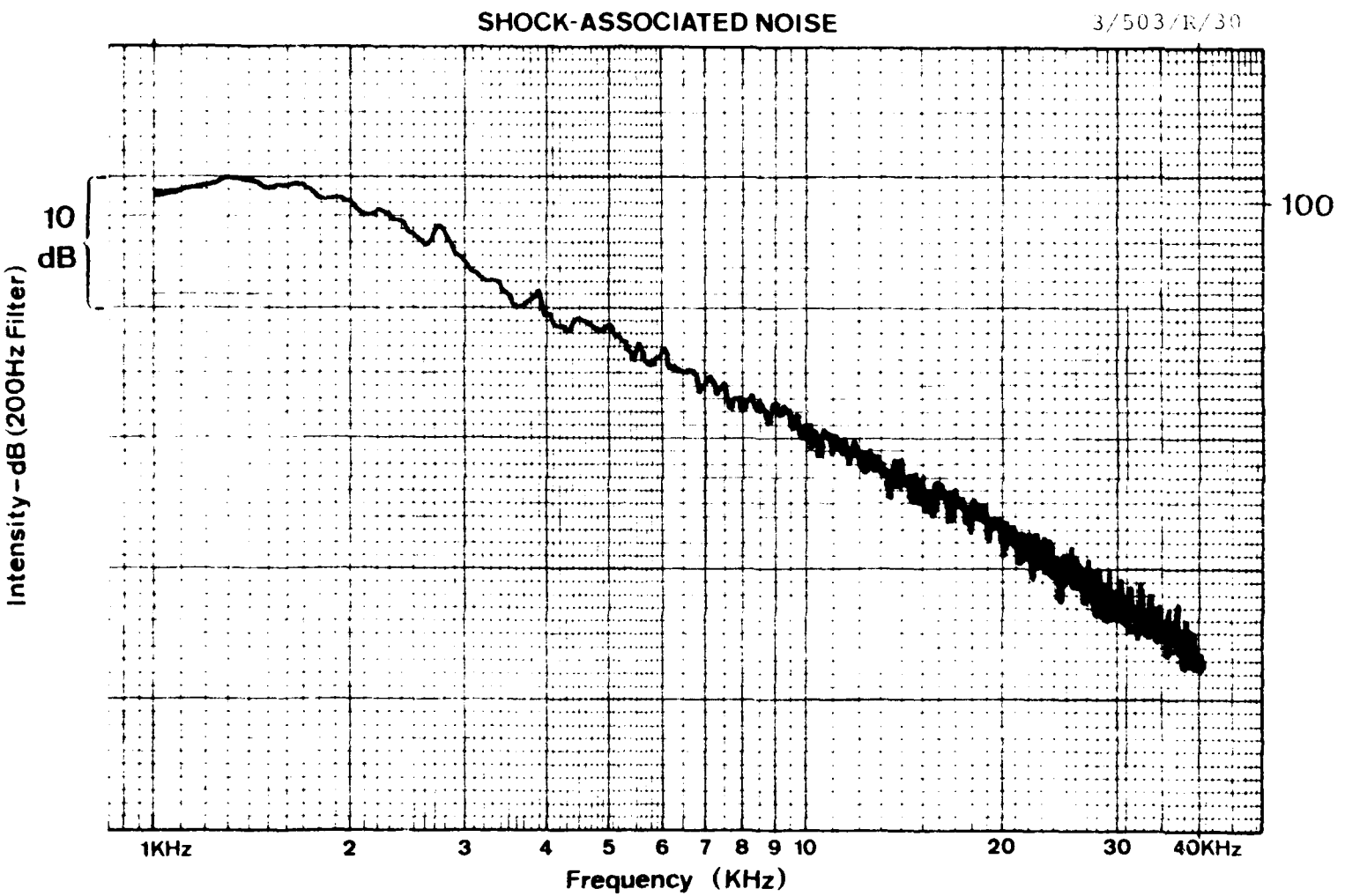
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
3/503/R/30
10
dB
100
Intensity - dB (200Hz Filter)
1KHz
2
3
4
5
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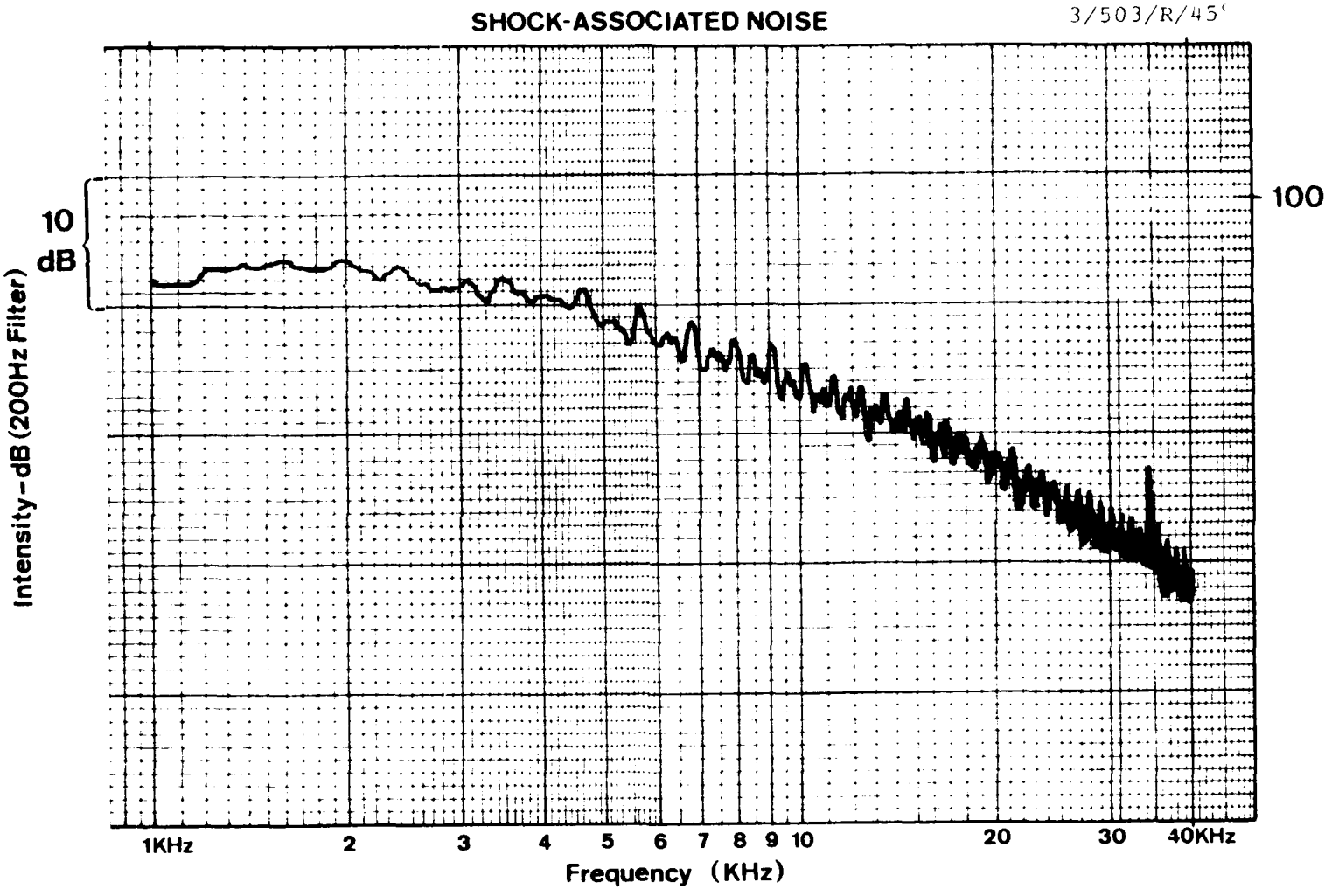
7
8
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
3/503/R/45
10
dB
100
Intensity-dB (200Hz Filter)
1KHz
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9
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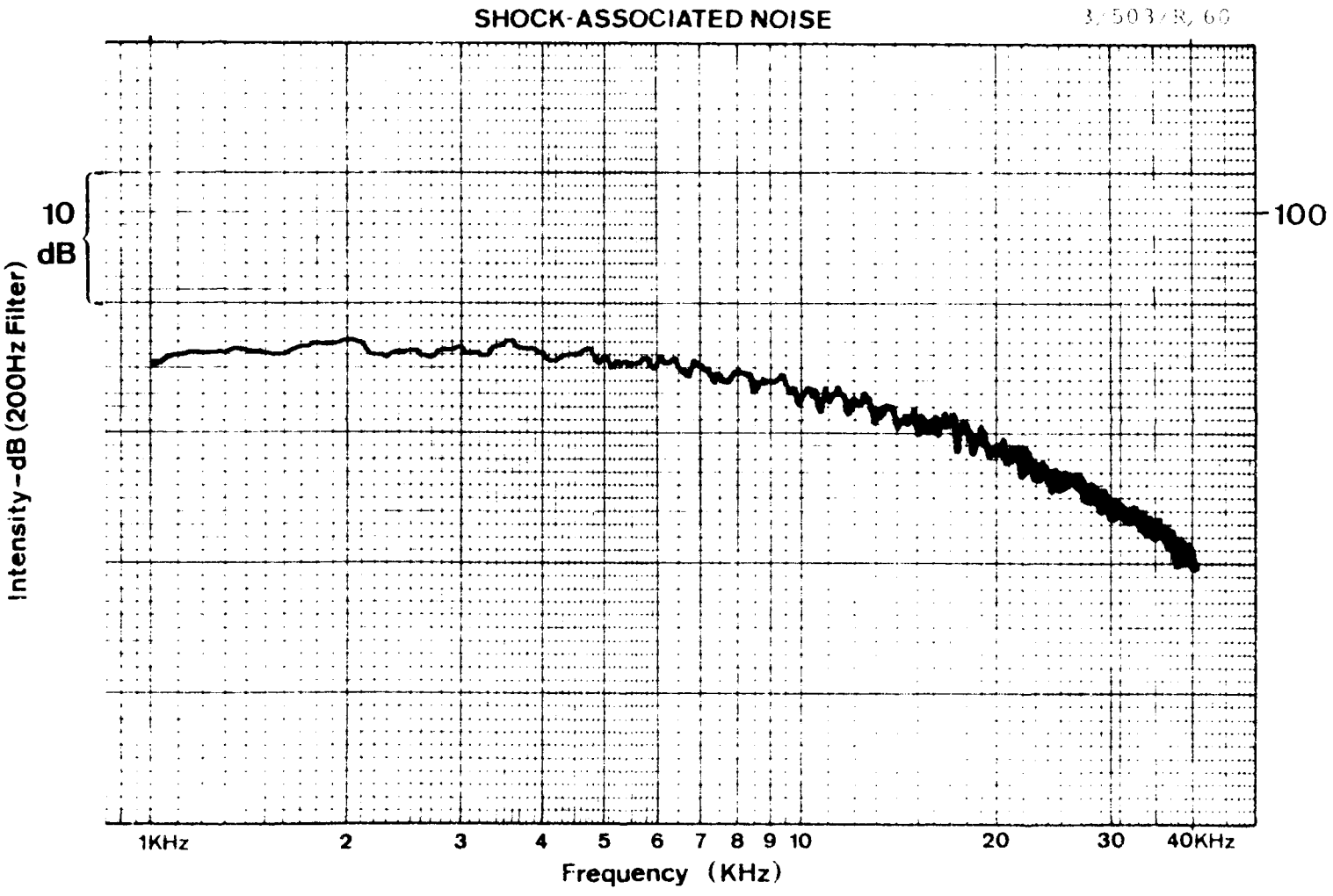
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
3/503/R, 60
10
dB
100
Intensity - dB (200Hz Filter)
1KHz
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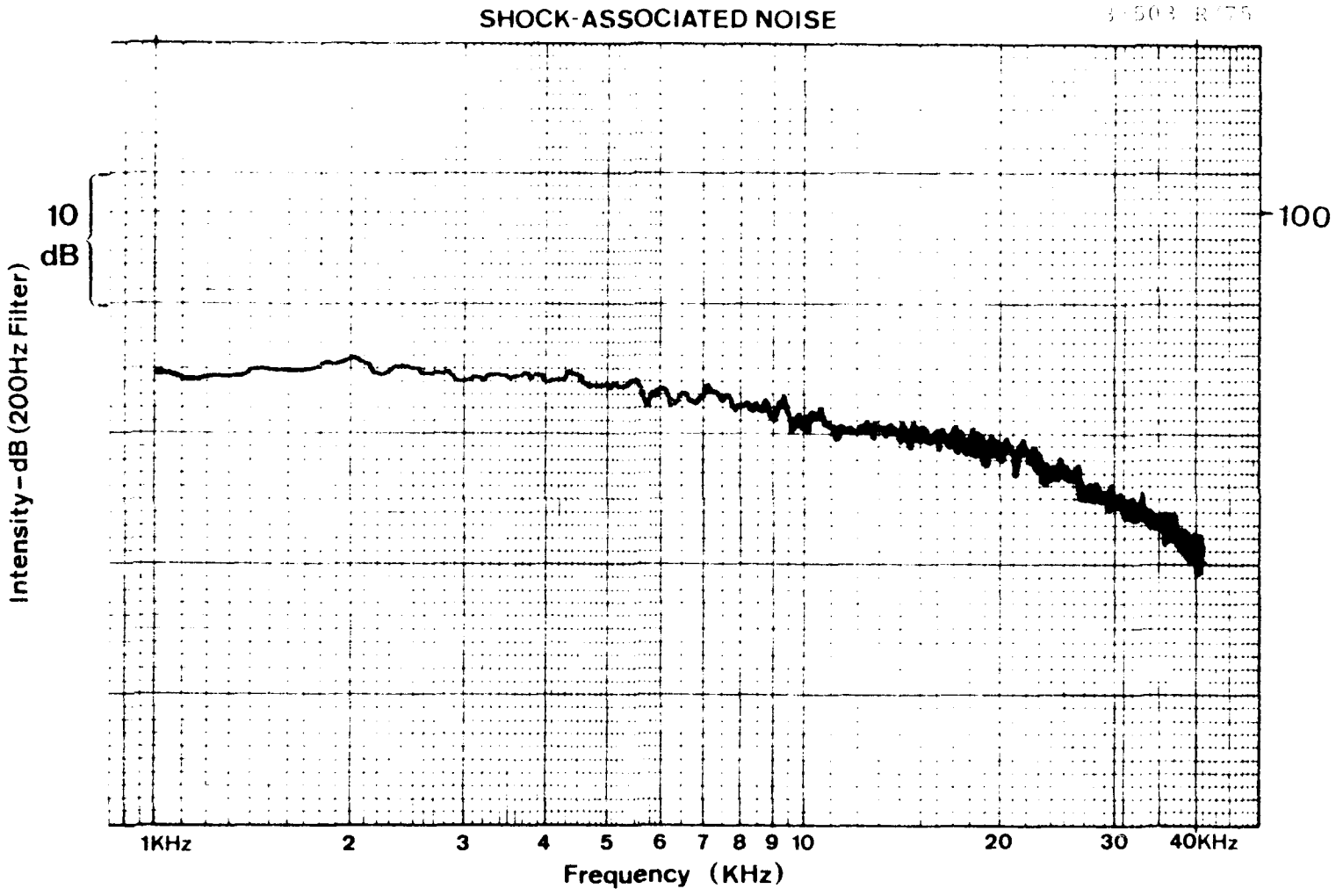
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
10
dB
100
Intensity-dB (200Hz Filter)
1KHz
2
3
4
5
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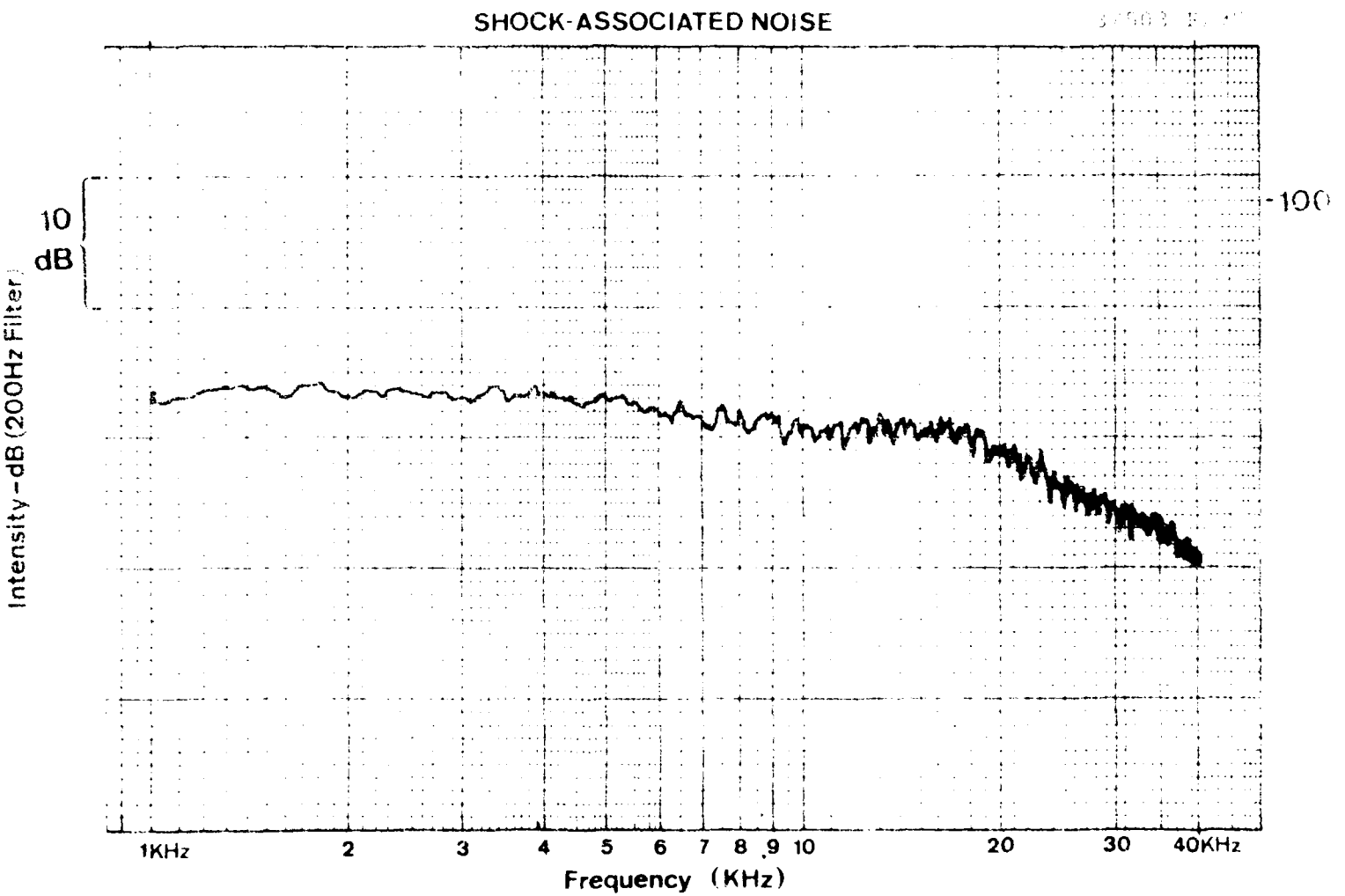
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
10
dB
100
Intensity - dB (200Hz Filter)
1KHz
2
3
4
5
6
7
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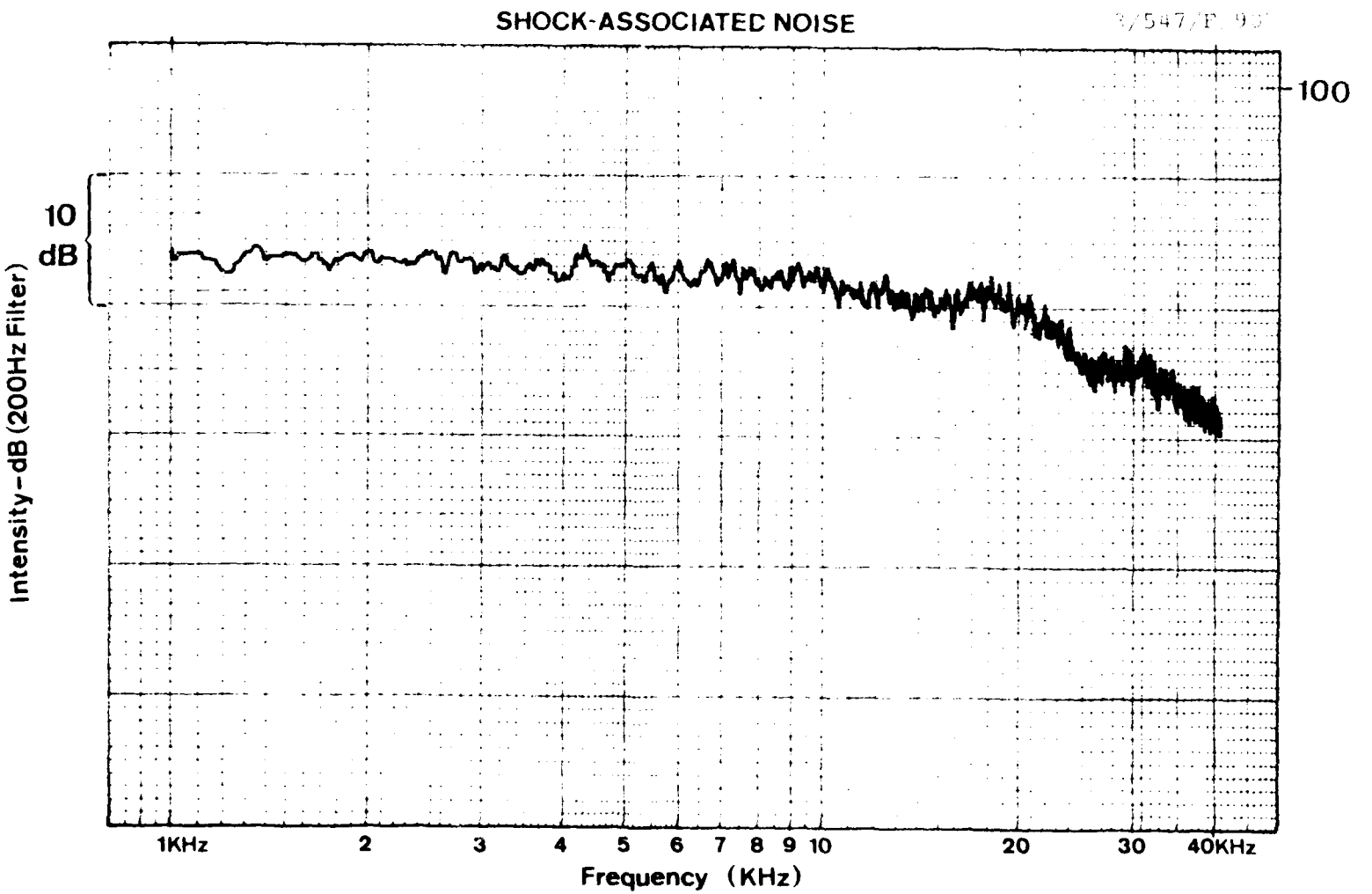
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
100
10
dB
Intensity-dB (200Hz Filter)
1KHz
2
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4
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6
7
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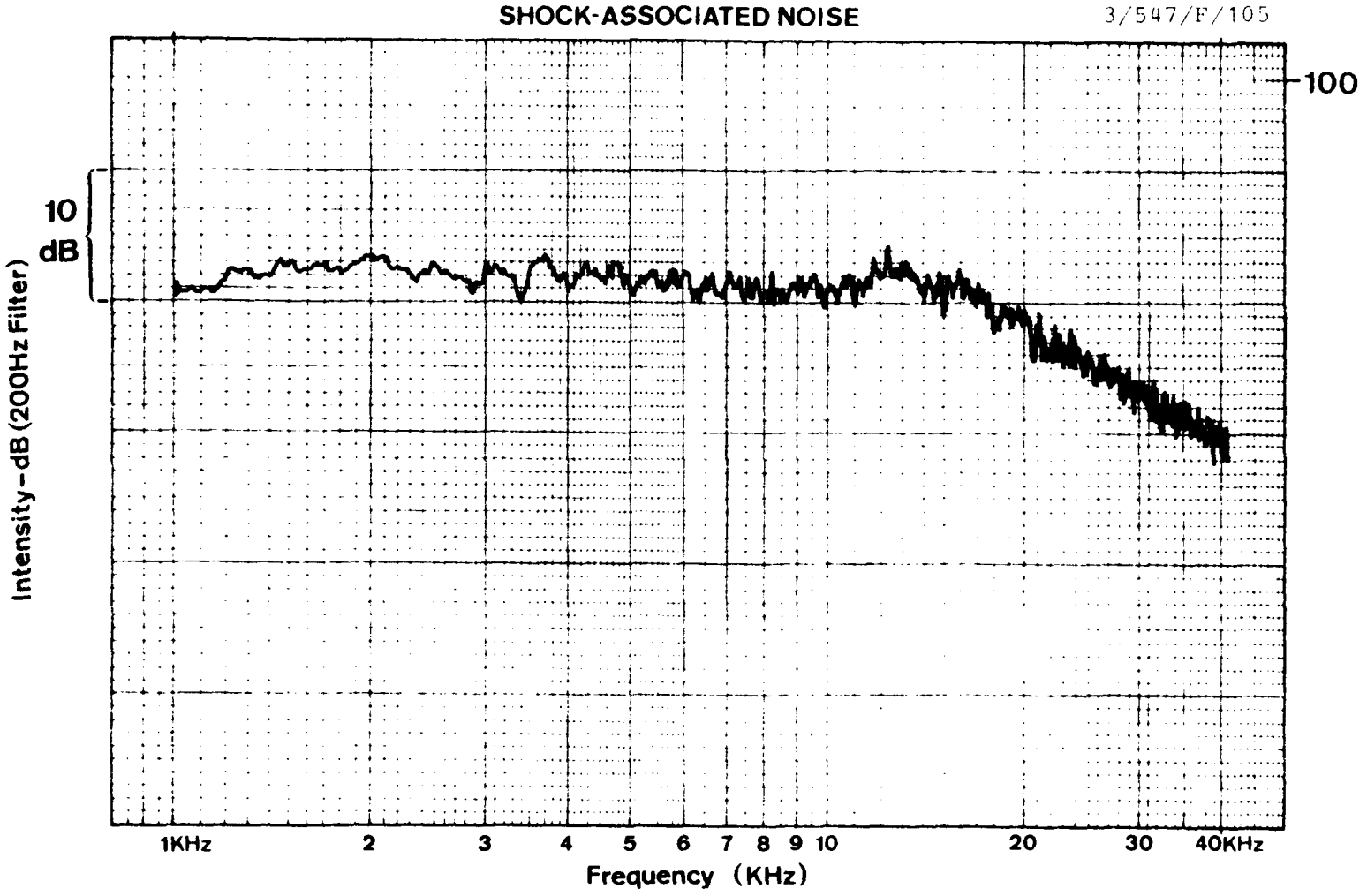
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
3/547/F/105
100
10
dB
Intensity-dB (200Hz Filter)
1KHz
2
3
4
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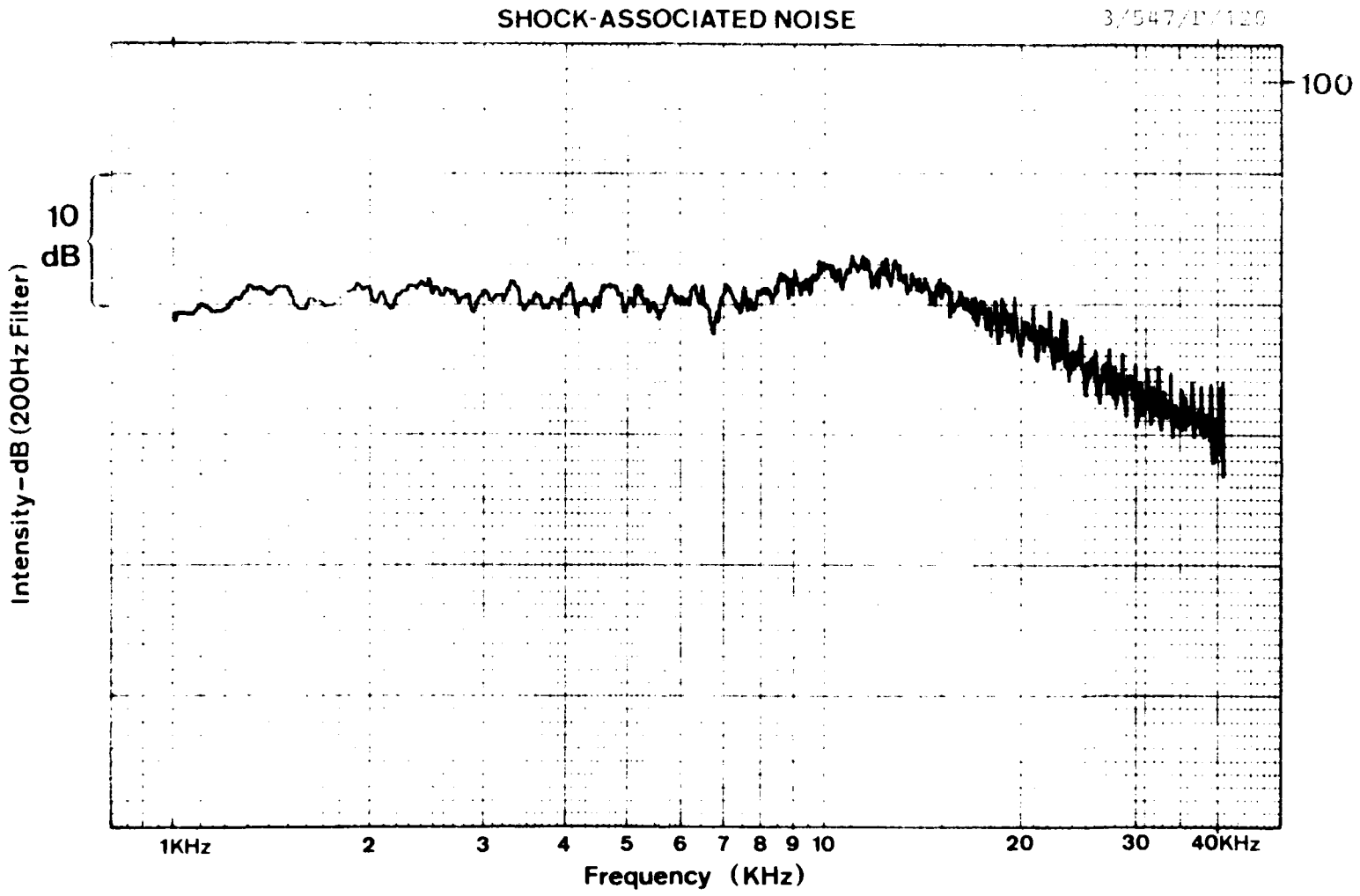
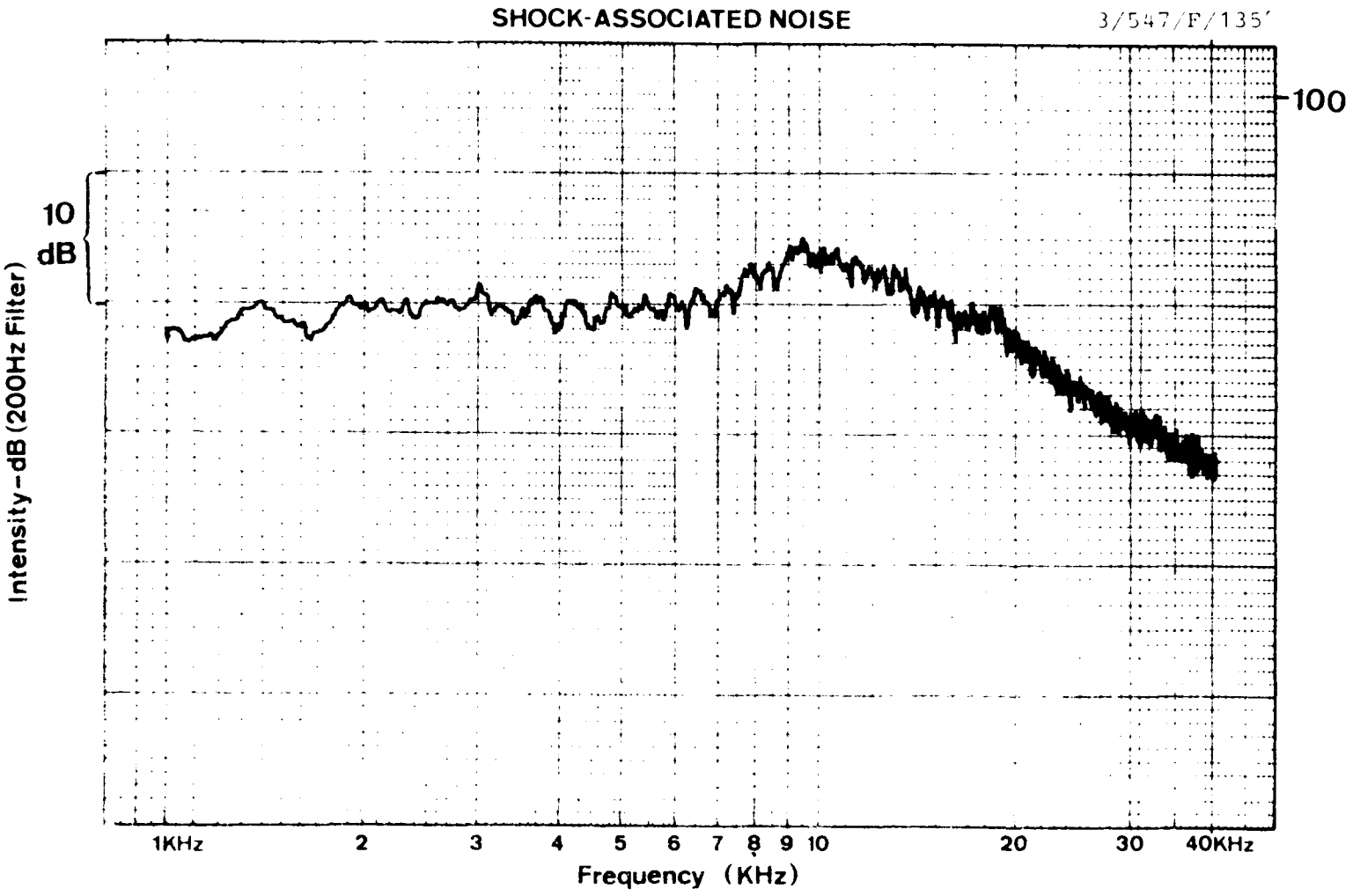
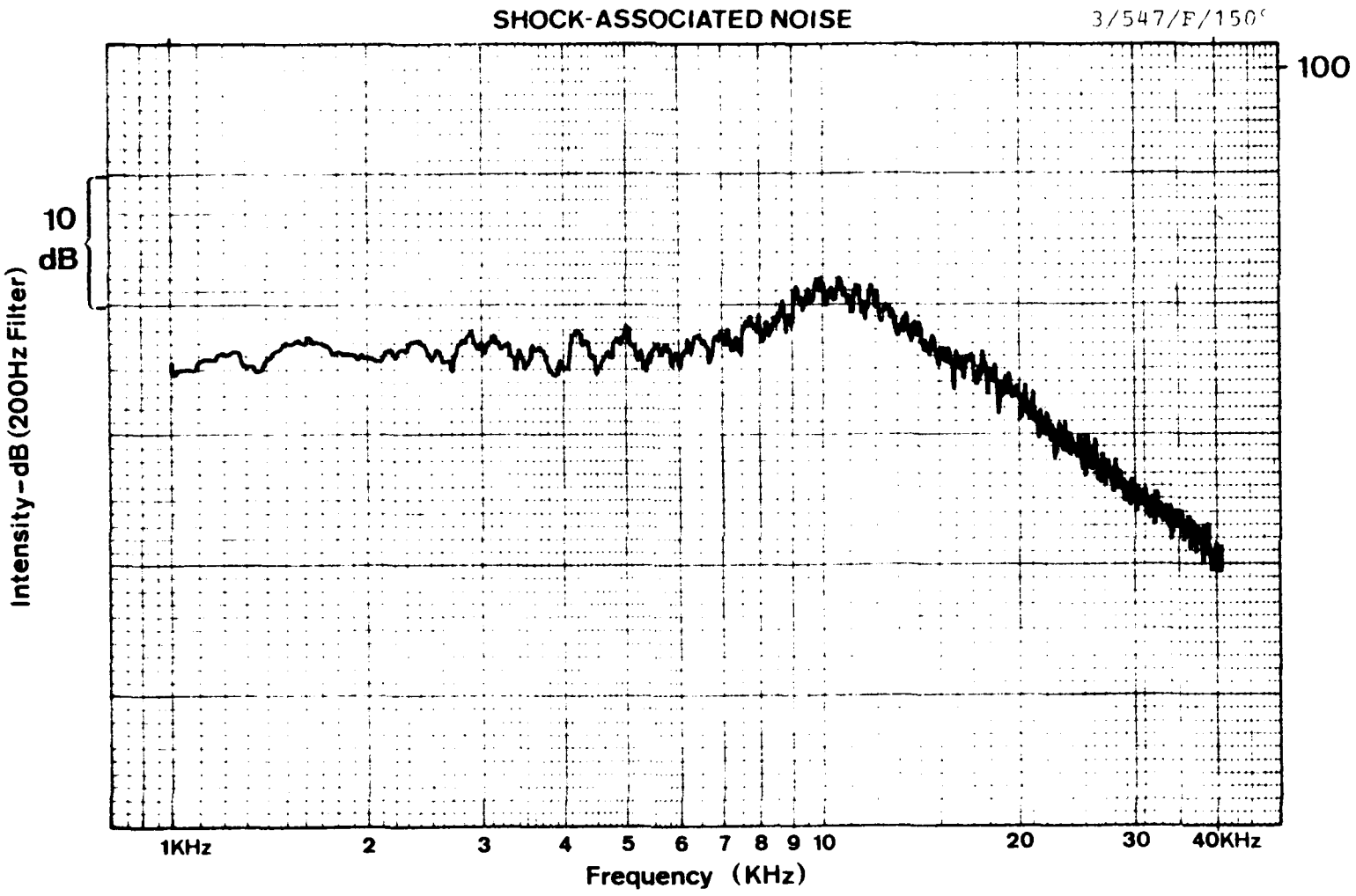
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
100
10
dB
Intensity-dB (200Hz Filter)
1KHz
2
3
4
5
6
7
8
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
3/547/F/135'
100
10
dB
Intensity-dB (200Hz Filter)
1KHz
2
3
4
5
6
7
8
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
3/547/F/150'
100
10
dB
Intensity-dB (200Hz Filter)
1KHz
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4
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7
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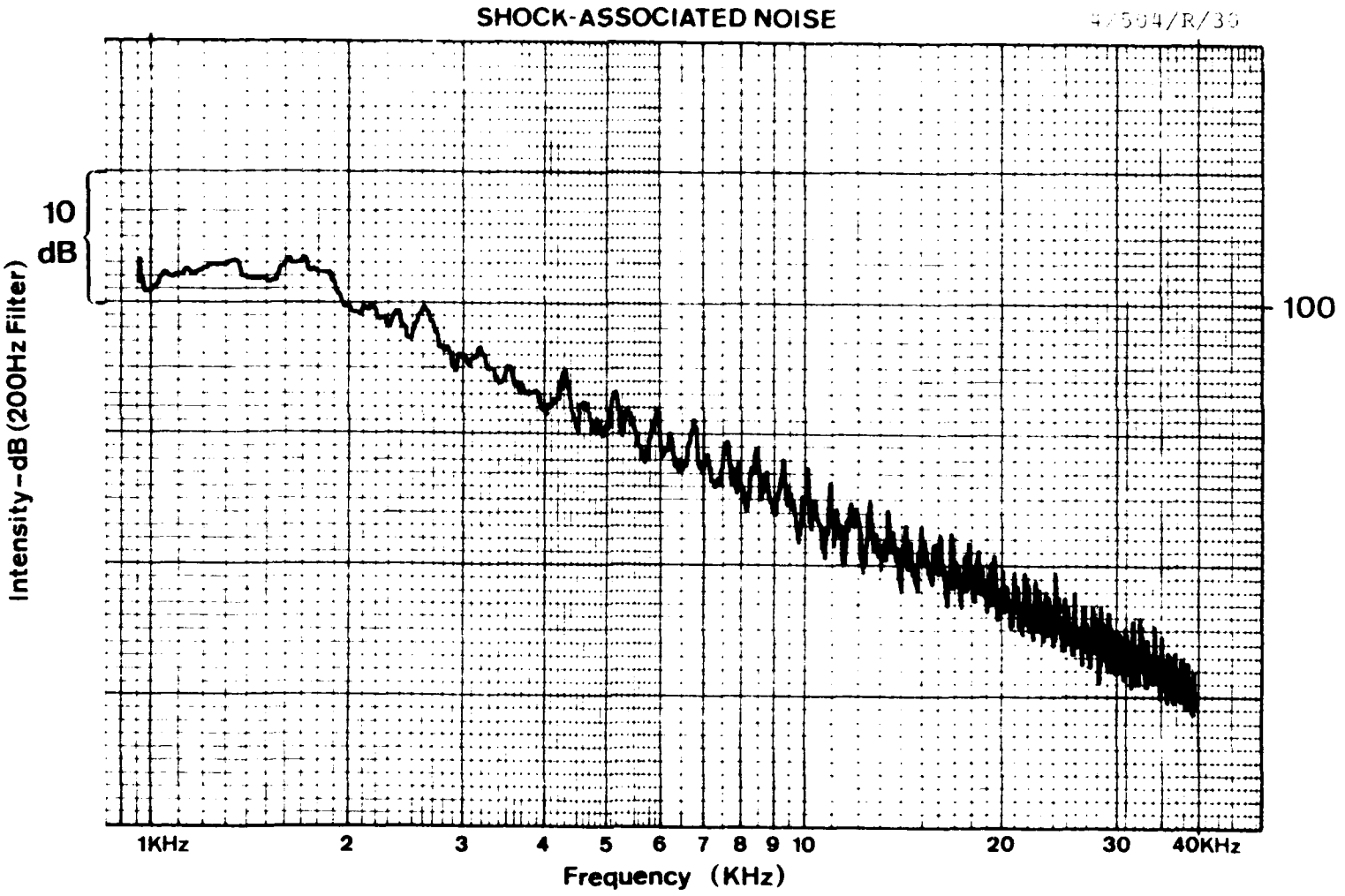
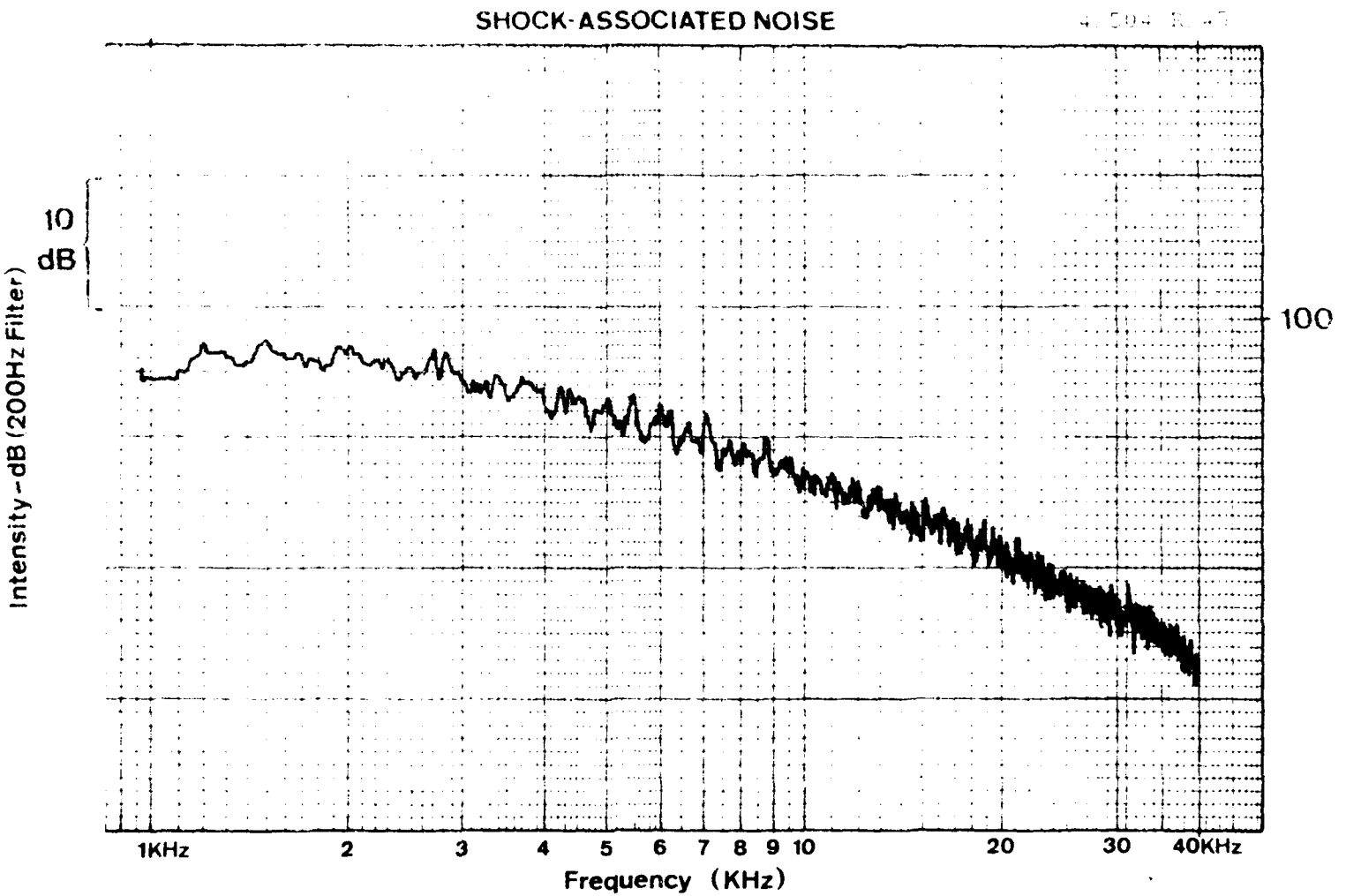
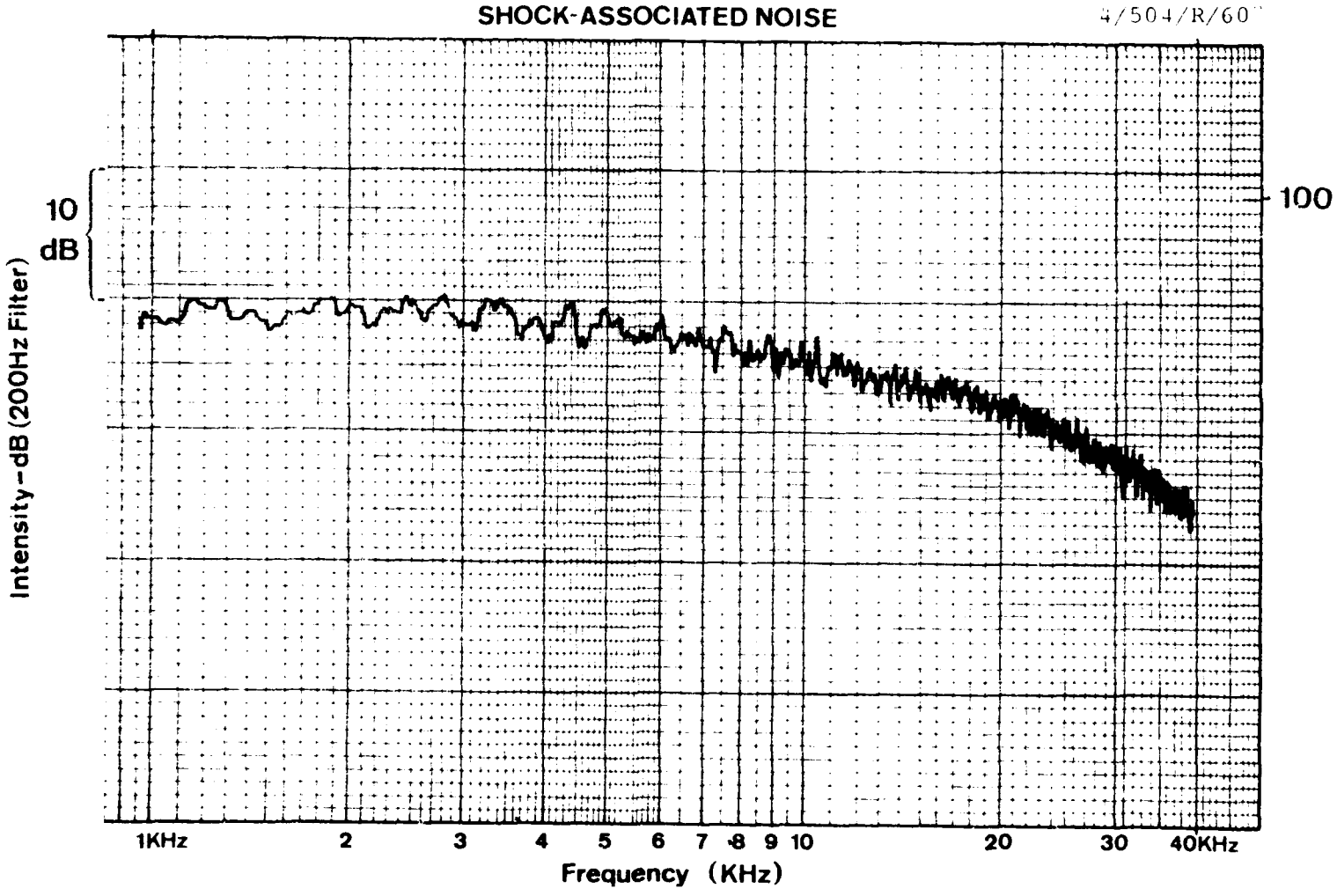
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
4/504/R/30
10
dB
100
Intensity-dB (200Hz Filter)
1KHz
2
3
4
5
6
7
8
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
10
dB
Intensity - dB (200Hz Filter)
100
1KHz
2
3
4
5
6
7
8
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
4/504/R/60
10
dB
100
Intensity - dB (200Hz Filter)
1KHz
2
3
4
5
6
7
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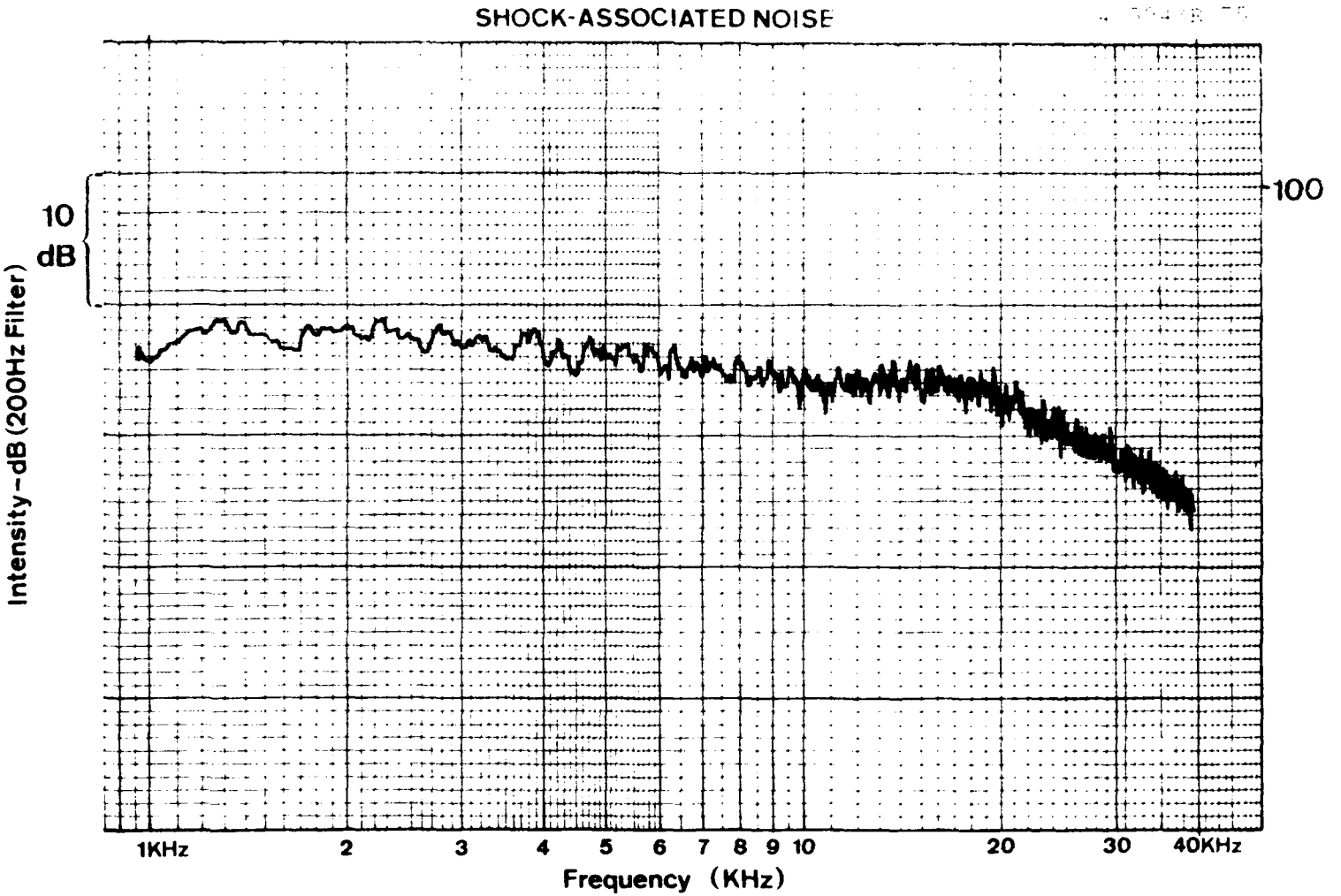
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
10
dB
100
Intensity - dB (200Hz Filter)
1KHz
2
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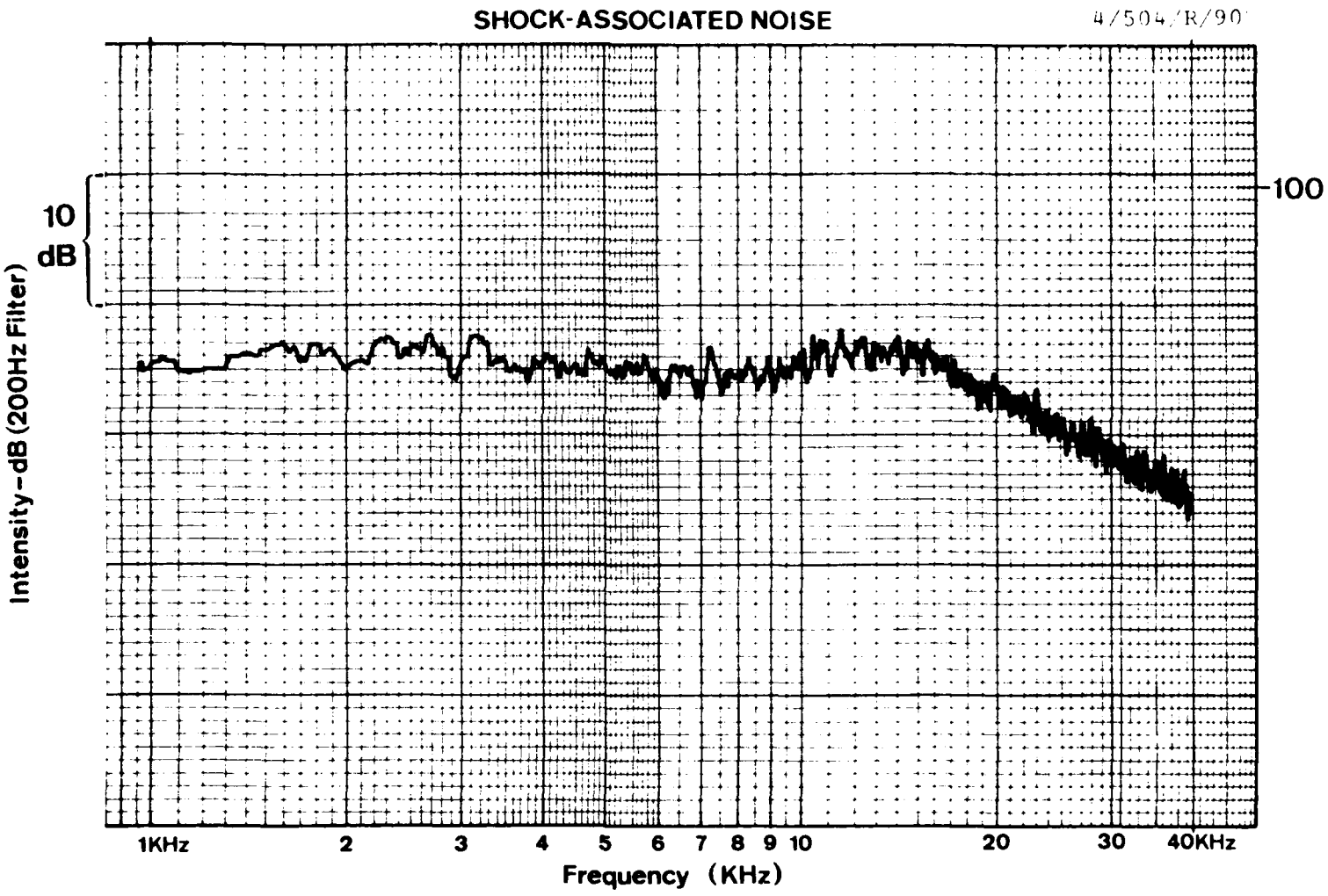
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
4/504/R/90
10
dB
100
Intensity-dB (200Hz Filter)
1KHz
2
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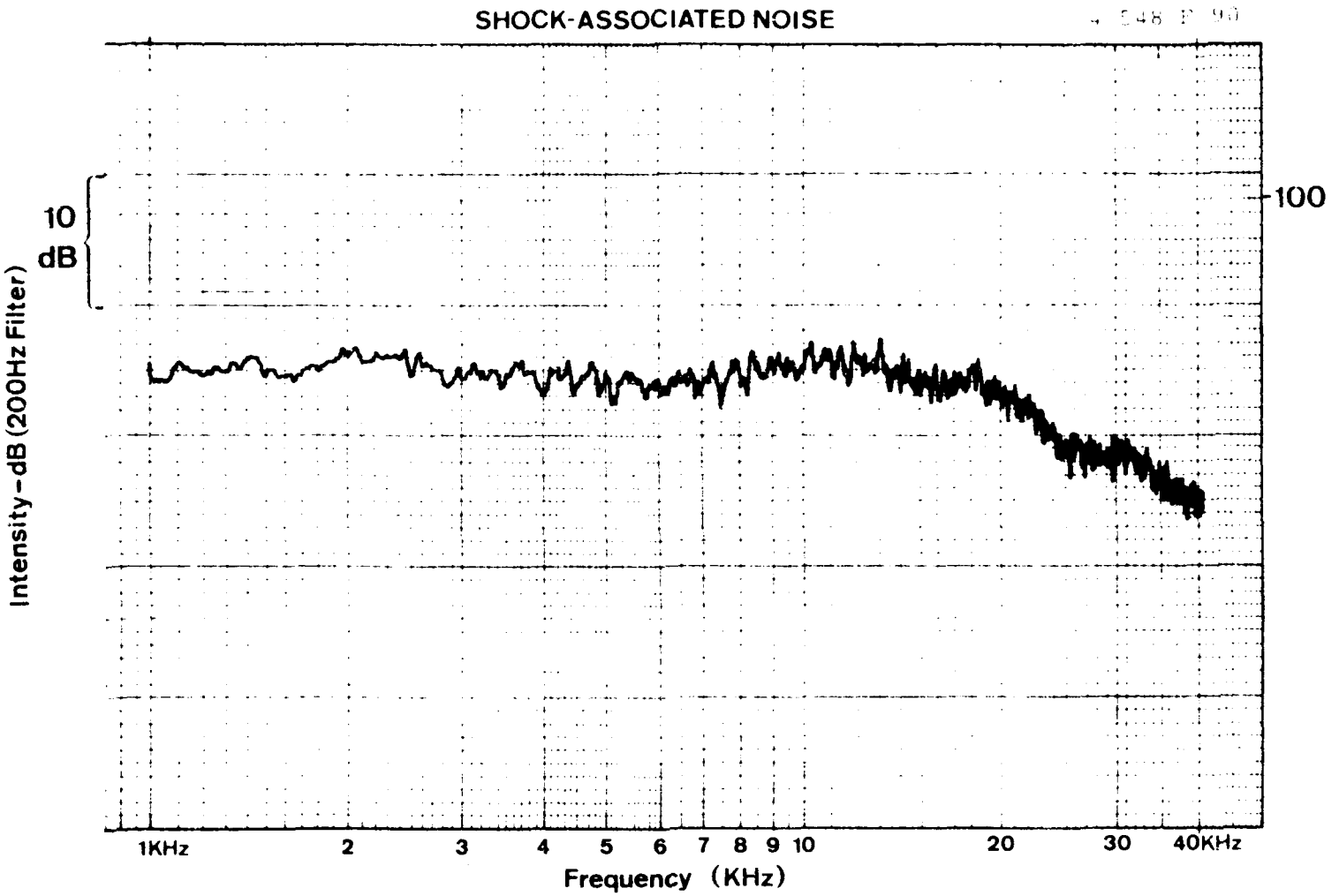
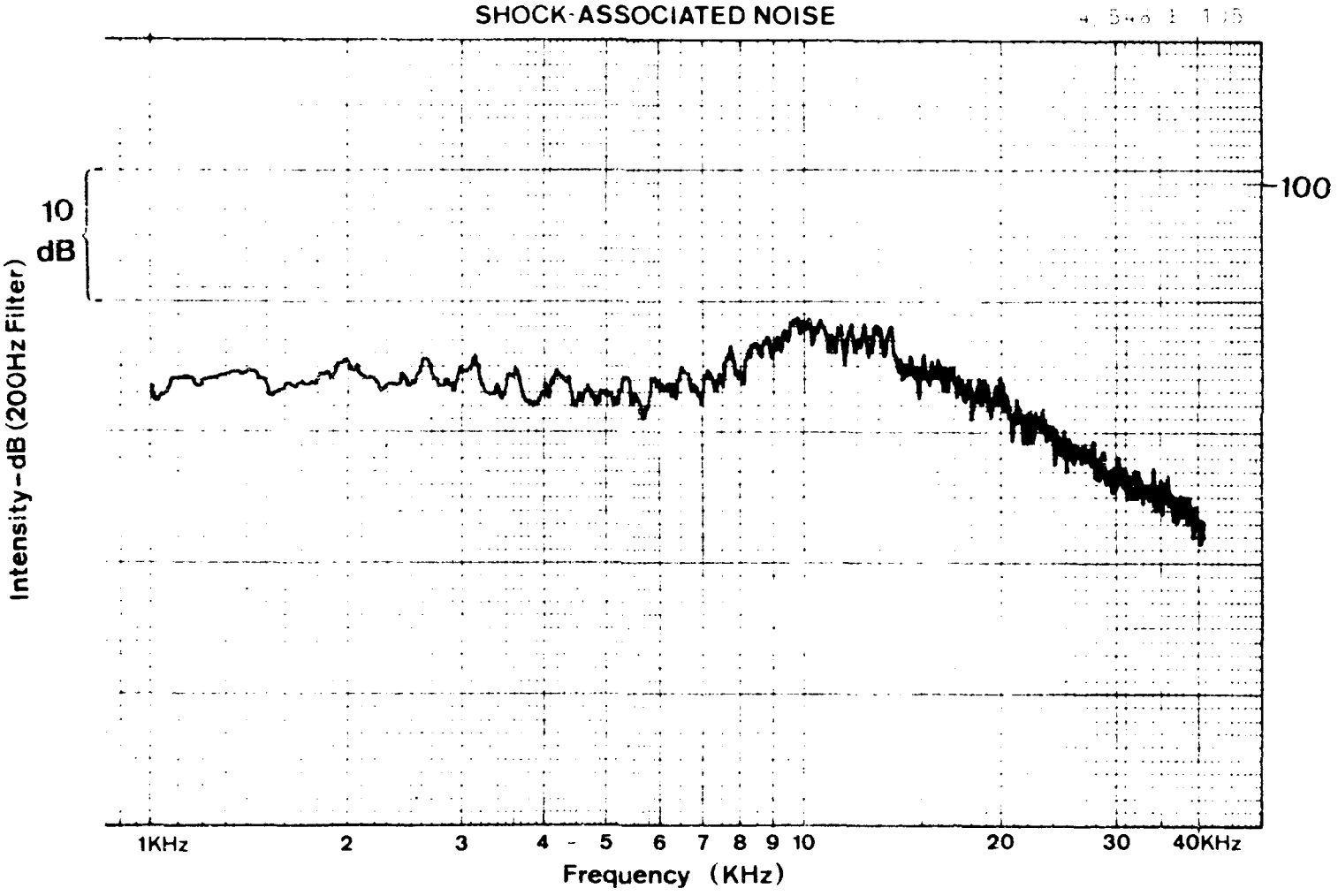
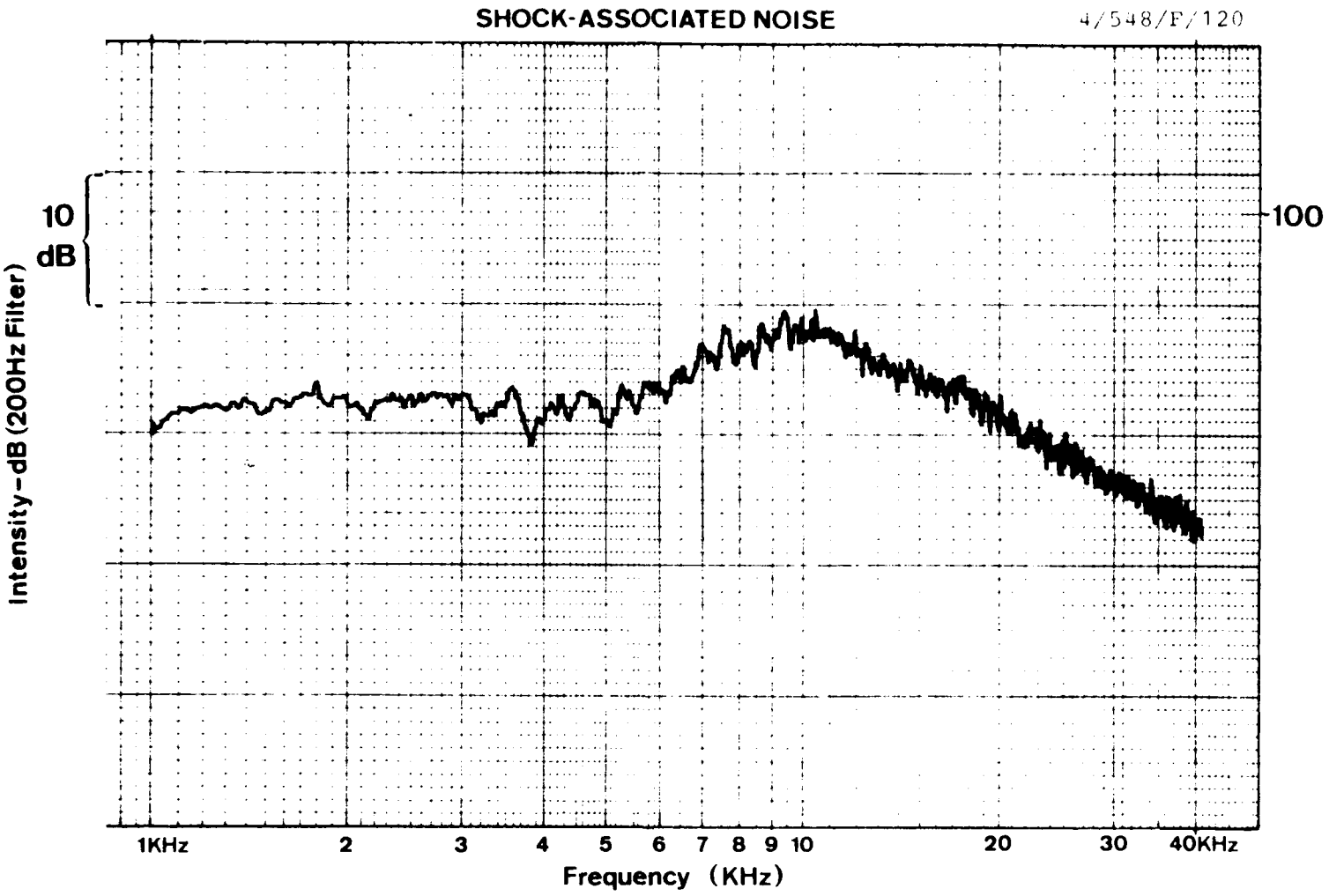
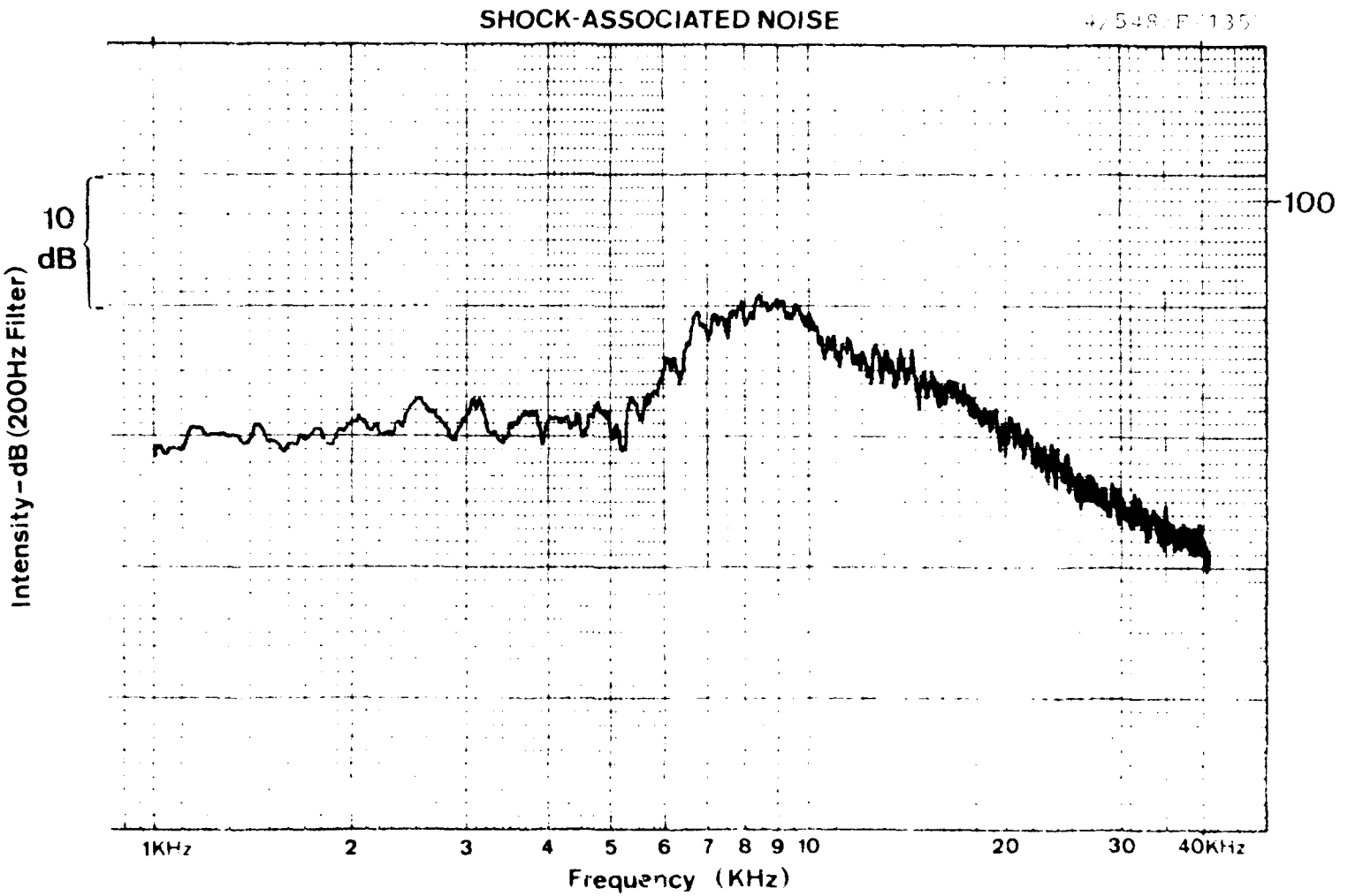
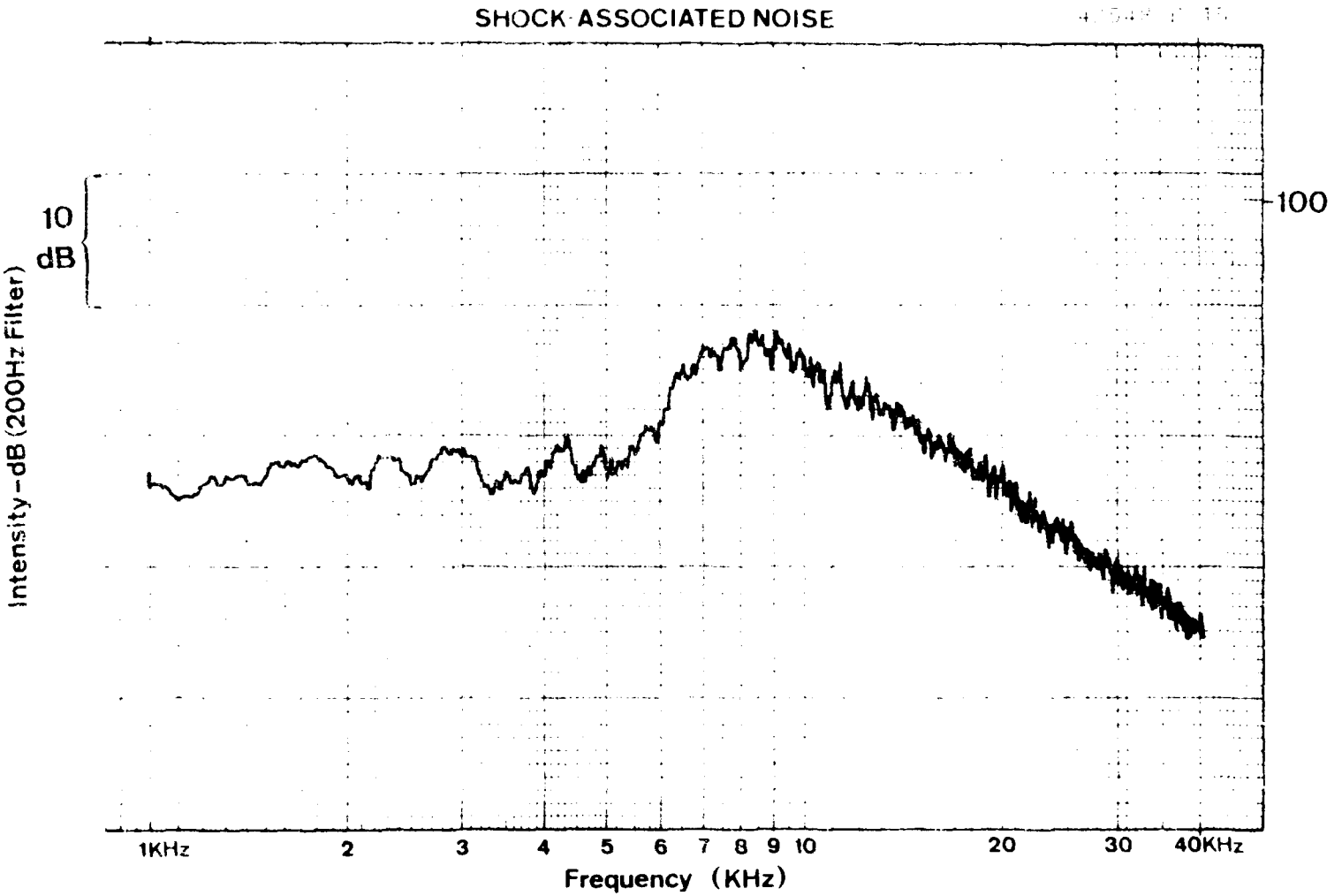
9
10
20
30
40KHz
Frequency (KHz)

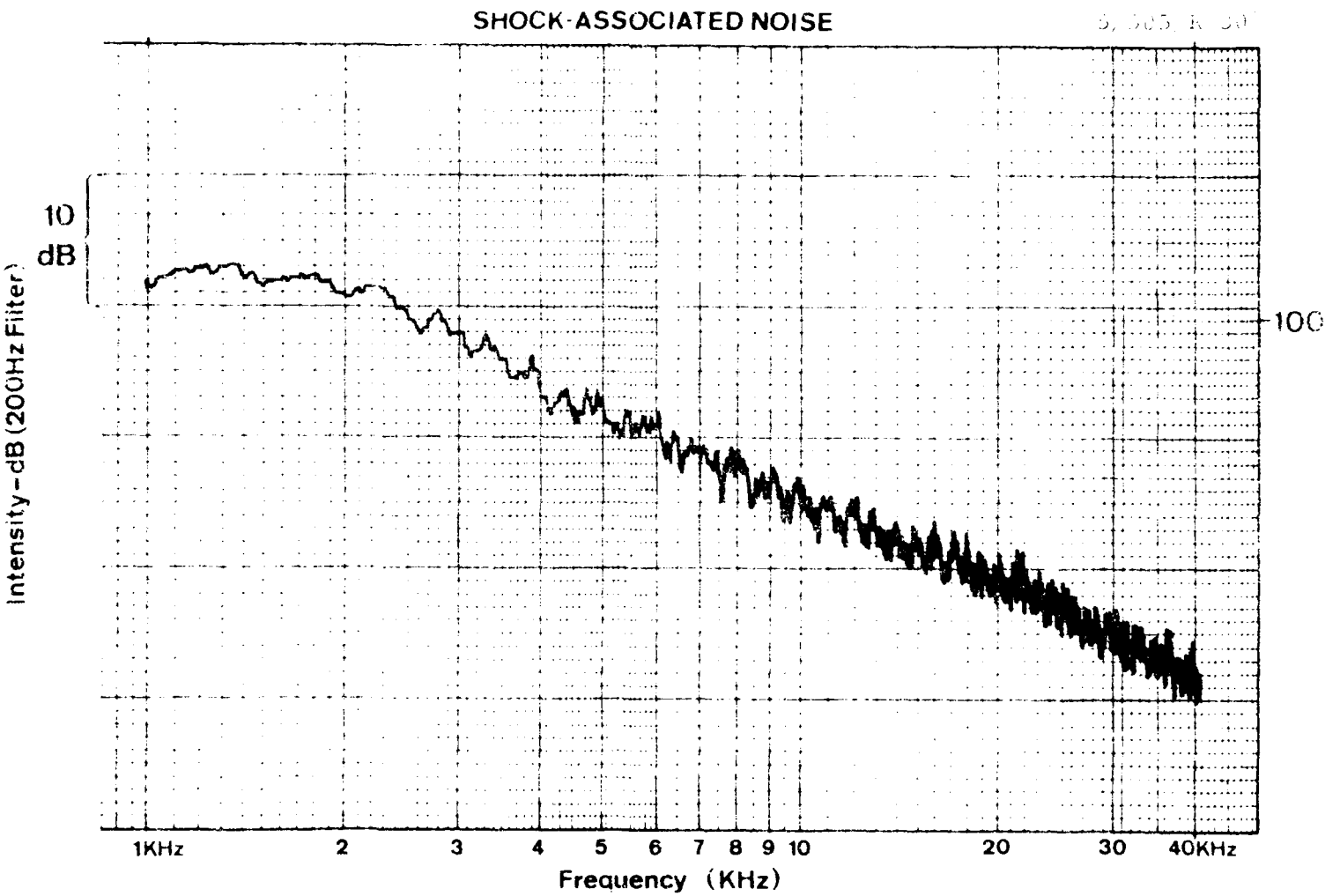

SHOCK-ASSOCIATED NOISE
10
dB
100
Intensity-dB (200Hz Filter)
1KHz
2
3
4
5
6
7
8
9
10
20
30
40KHz
Frequency (KHz)

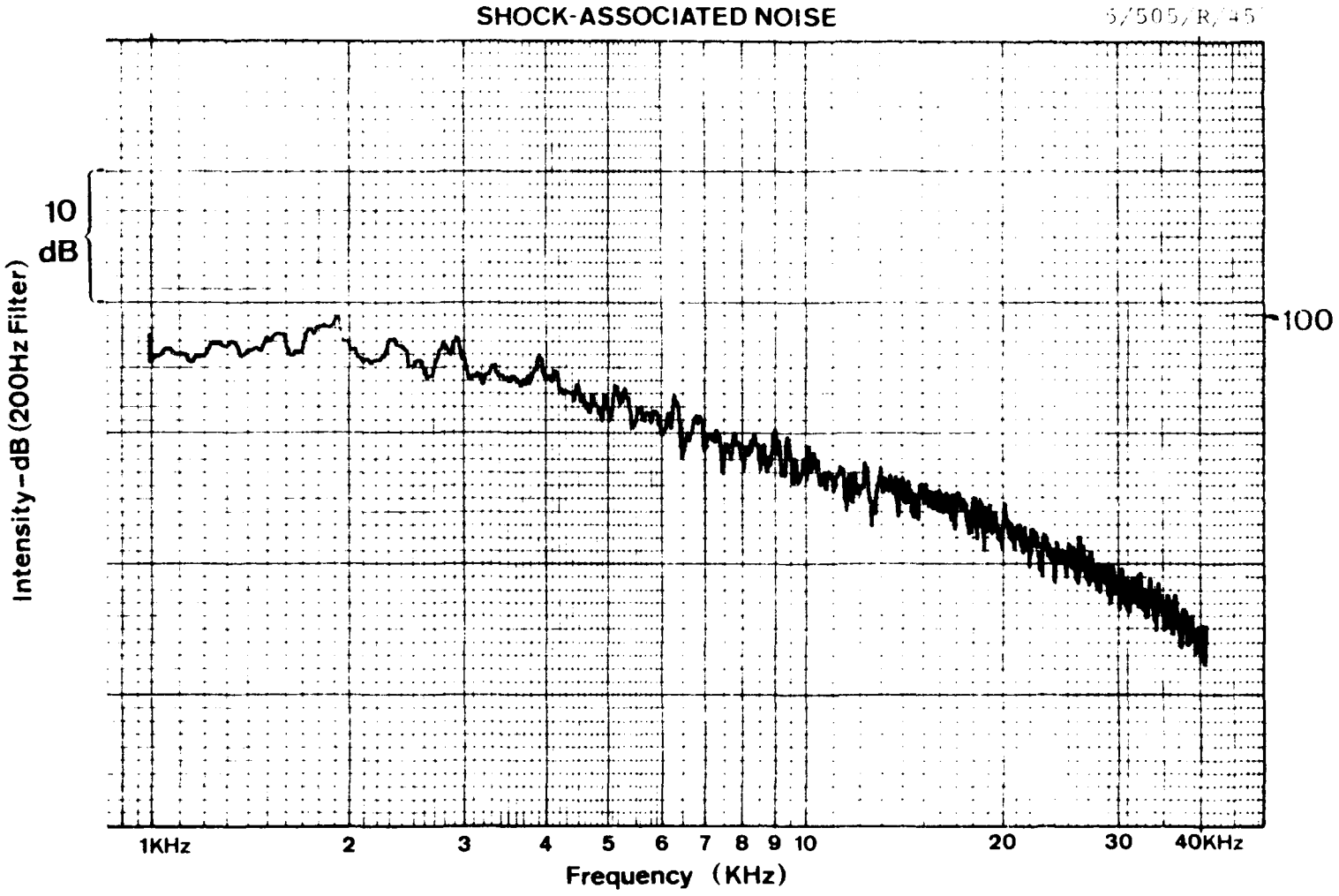

SHOCK-ASSOCIATED NOISE
100
10
dB
Intensity-dB (200Hz Filter)
1KHz
2
3
4
5
6
7
8
9
10
20
30
40KHz
Frequency (KHz)

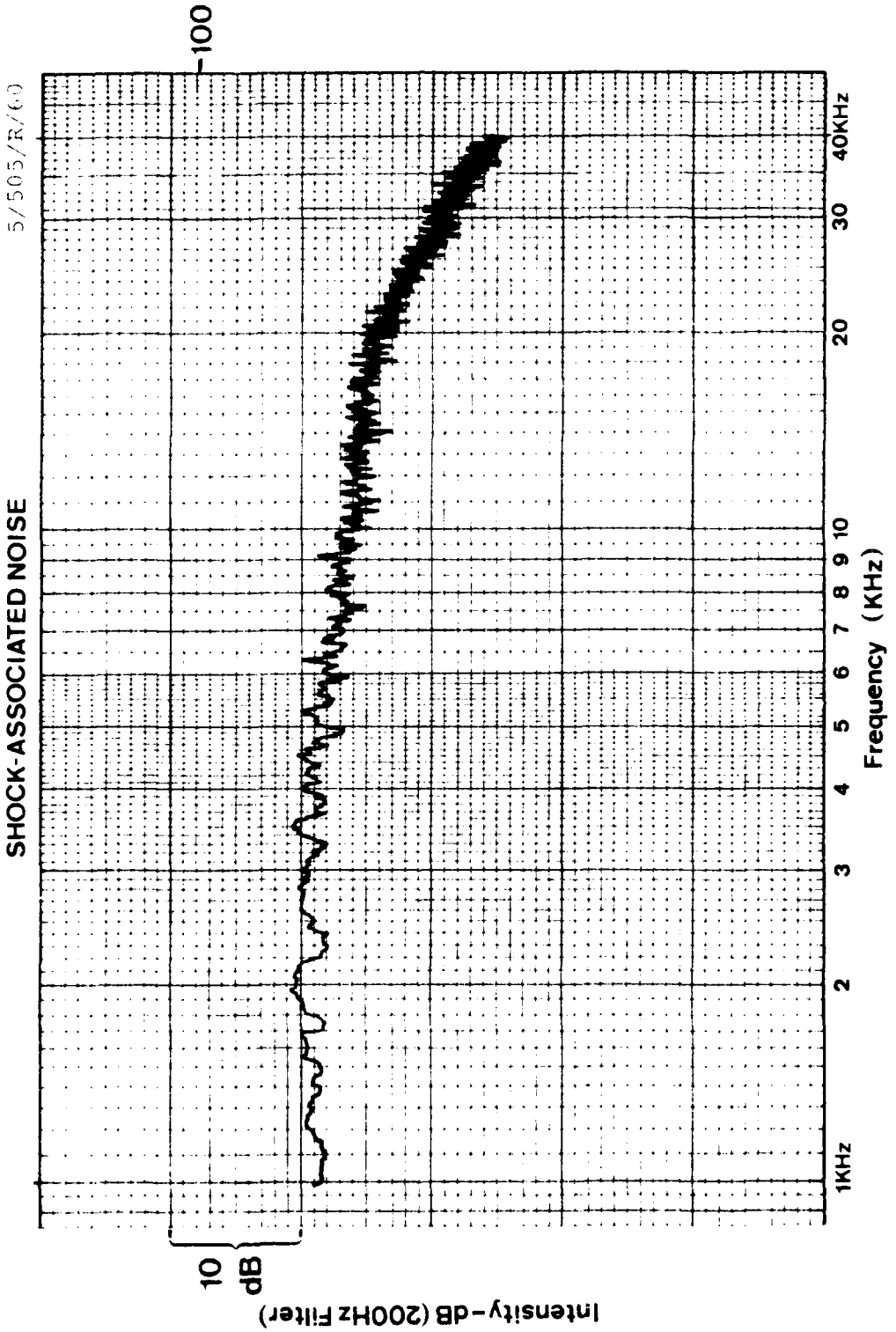

SHOCK-ASSOCIATED NOISE
4/548/F/120
10
dB
100
Intensity - dB (200Hz Filter)
1KHz
2
3
4
5
6
7
8
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
10 dB
100
Intensity-dB (200Hz Filter)
1KHz
2
3
4
5
6
7
8
9
10
20
30
40KHz
Frequency (KHz)


SHOCK ASSOCIATED NOISE
10
dB
100
Intensity - dB (200Hz Filter)
1KHz
2
3
4
5
6
7
8
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
10
dB
Intensity - dB (200Hz Filter)
100
1KHz
2
3
4
5
6
7
8
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
5/505/R/45
10
dB
Intensity-dB (200Hz Filter)
100
1KHz
2
3
4
5
6
7
8
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
5/505/R/60
100
10 dB
Intensity – dB (200Hz Filter)
1KHz
2
3
4
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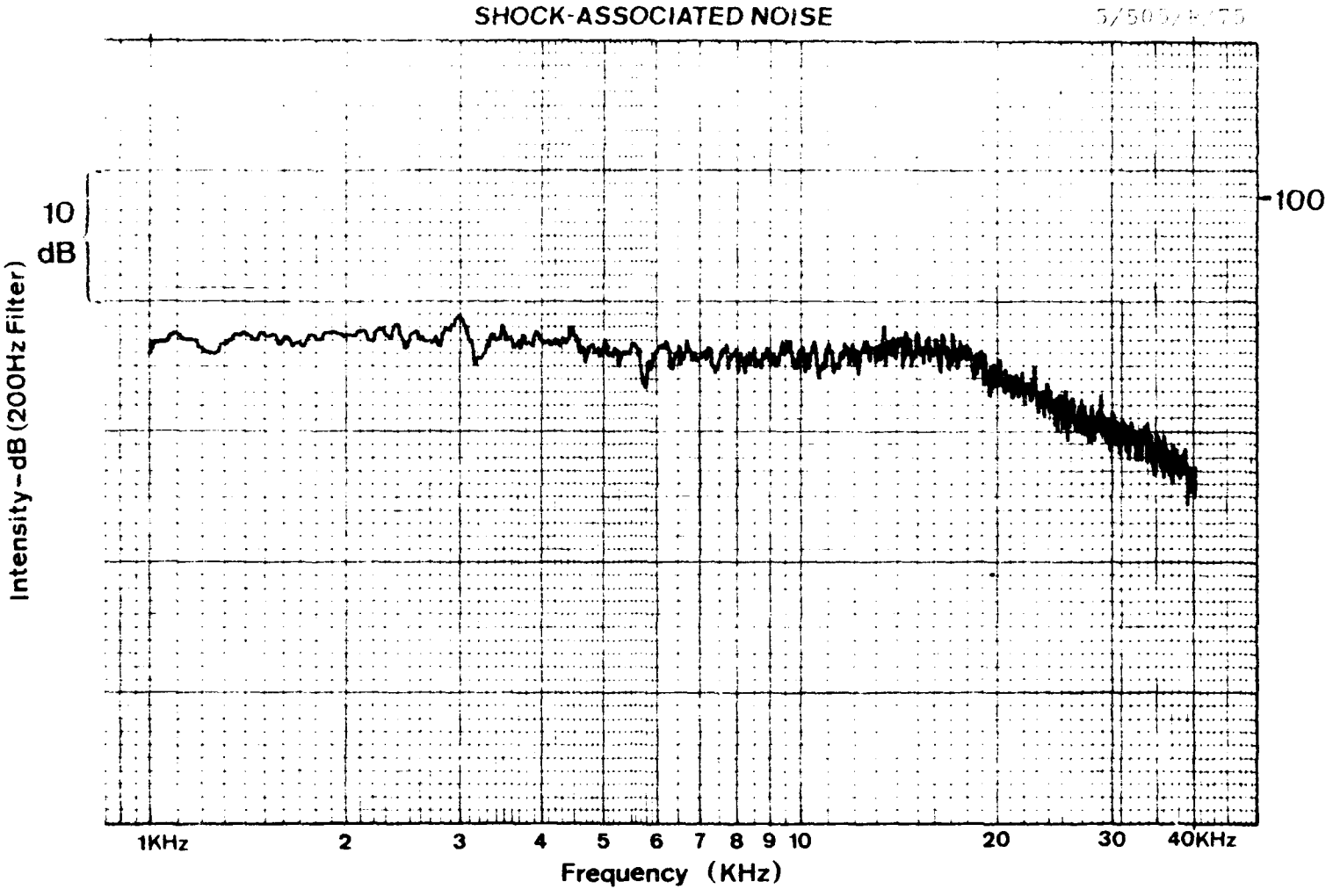
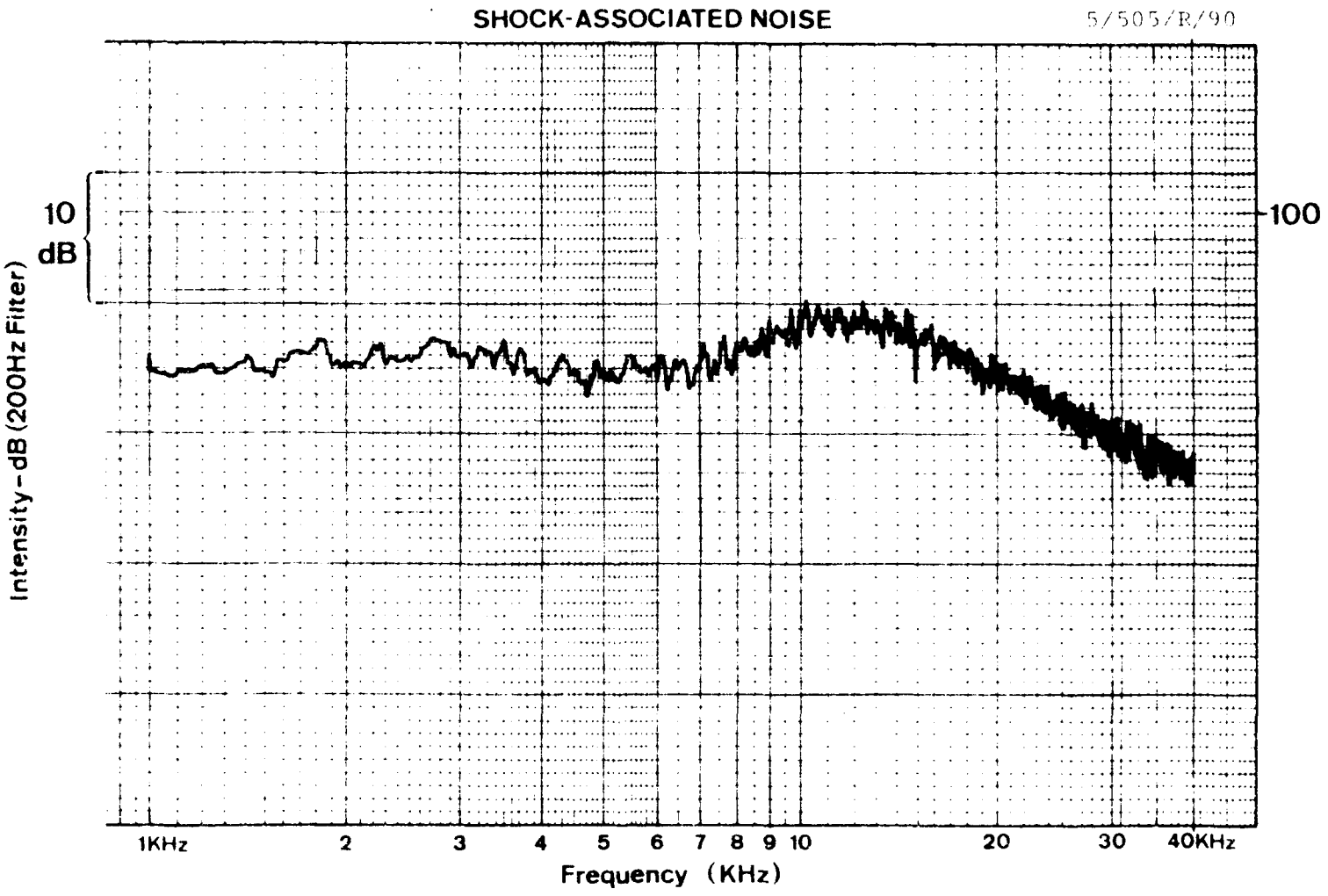
8
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
10
dB
100
Intensity-dB (200Hz Filter)
1KHz
2
3
4
5
6
7
8
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
5/505/R/90
10
dB
100
Intensity - dB (200Hz Filter)
1KHz
2
3
4
5
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8
9
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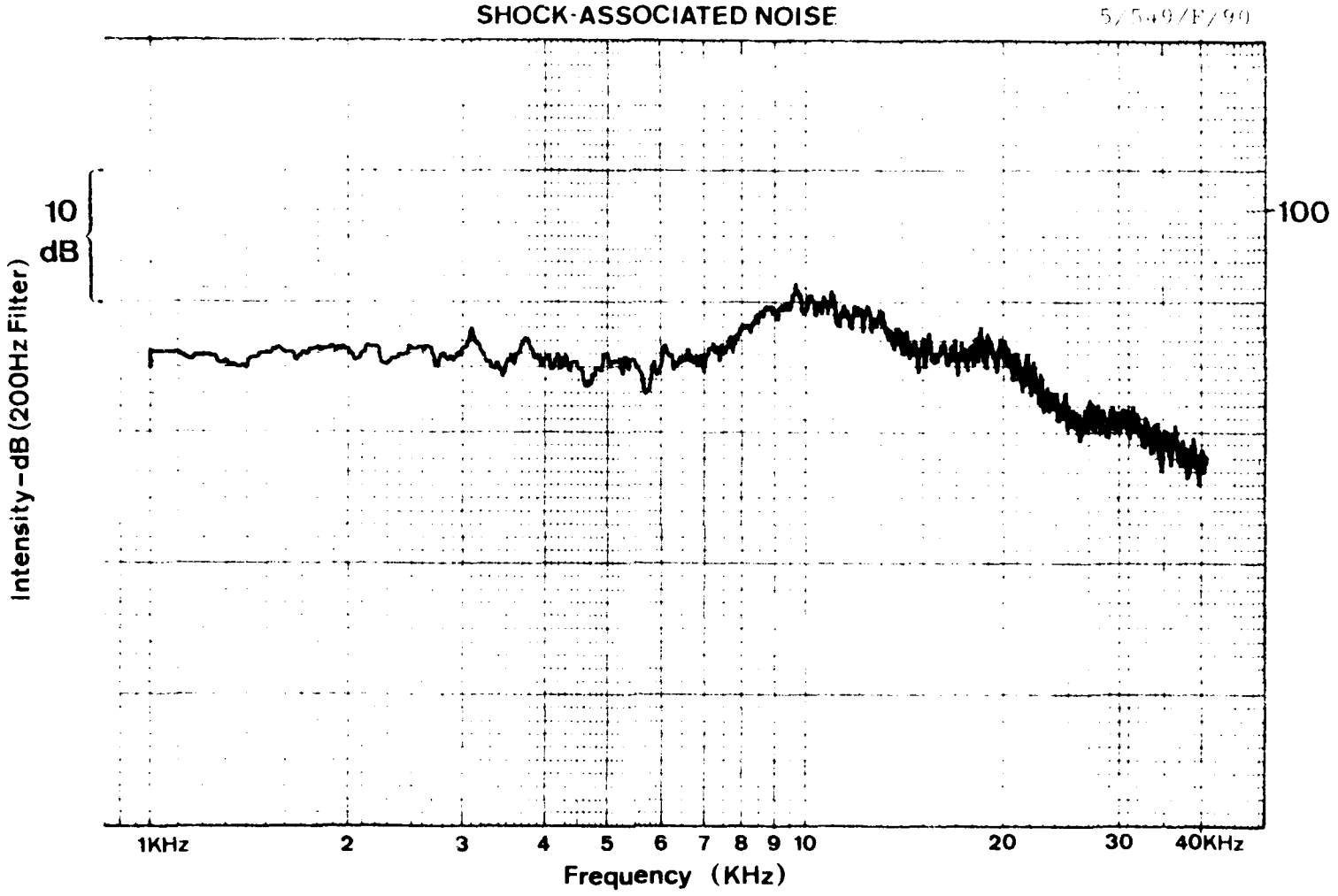
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
5/549/F/90
10
dB
100
Intensity-dB (200Hz Filter)
1KHz
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9
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20
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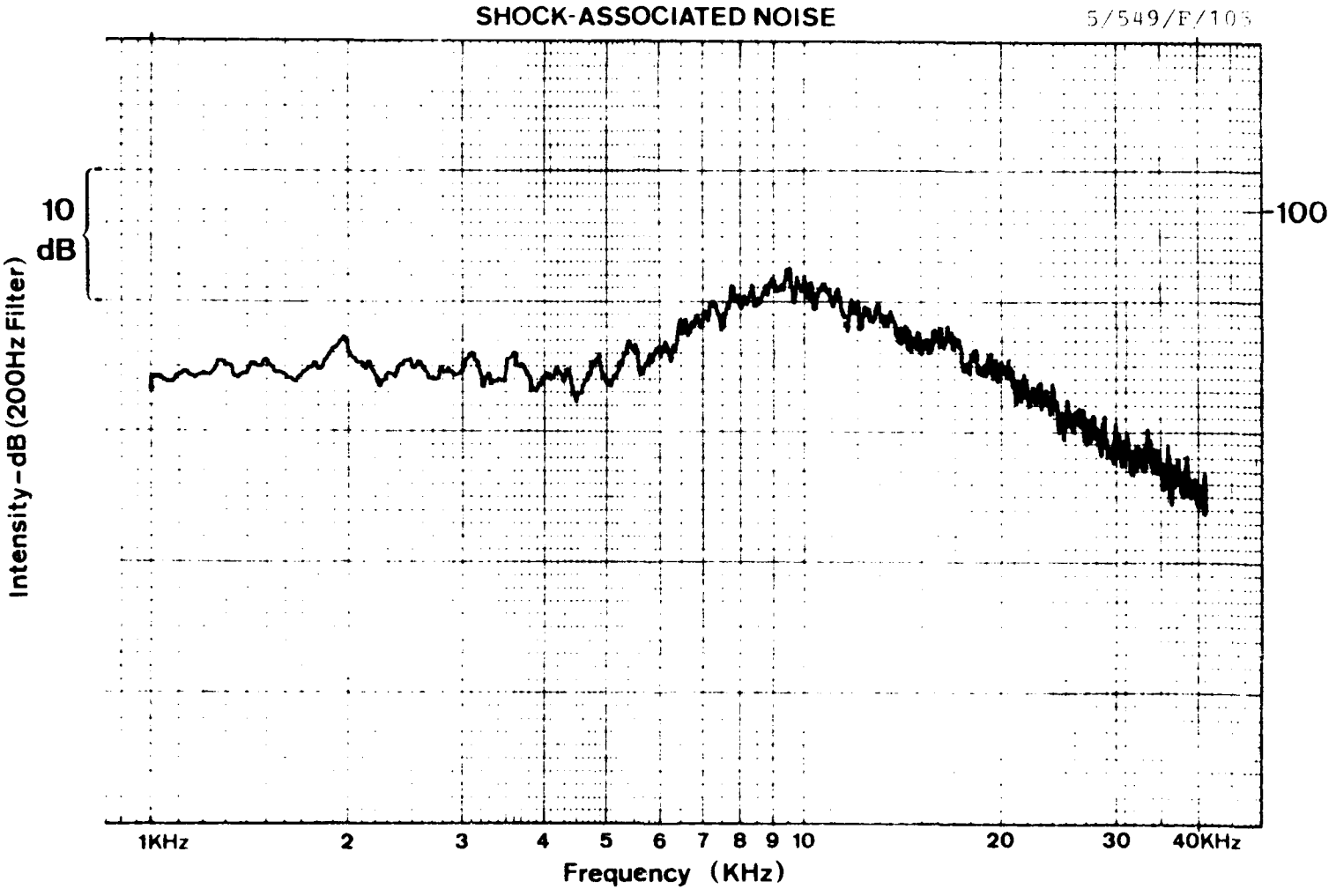
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
5/549/F/105
10
dB
100
Intensity-dB (200Hz Filter)
1KHz
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9
10
20
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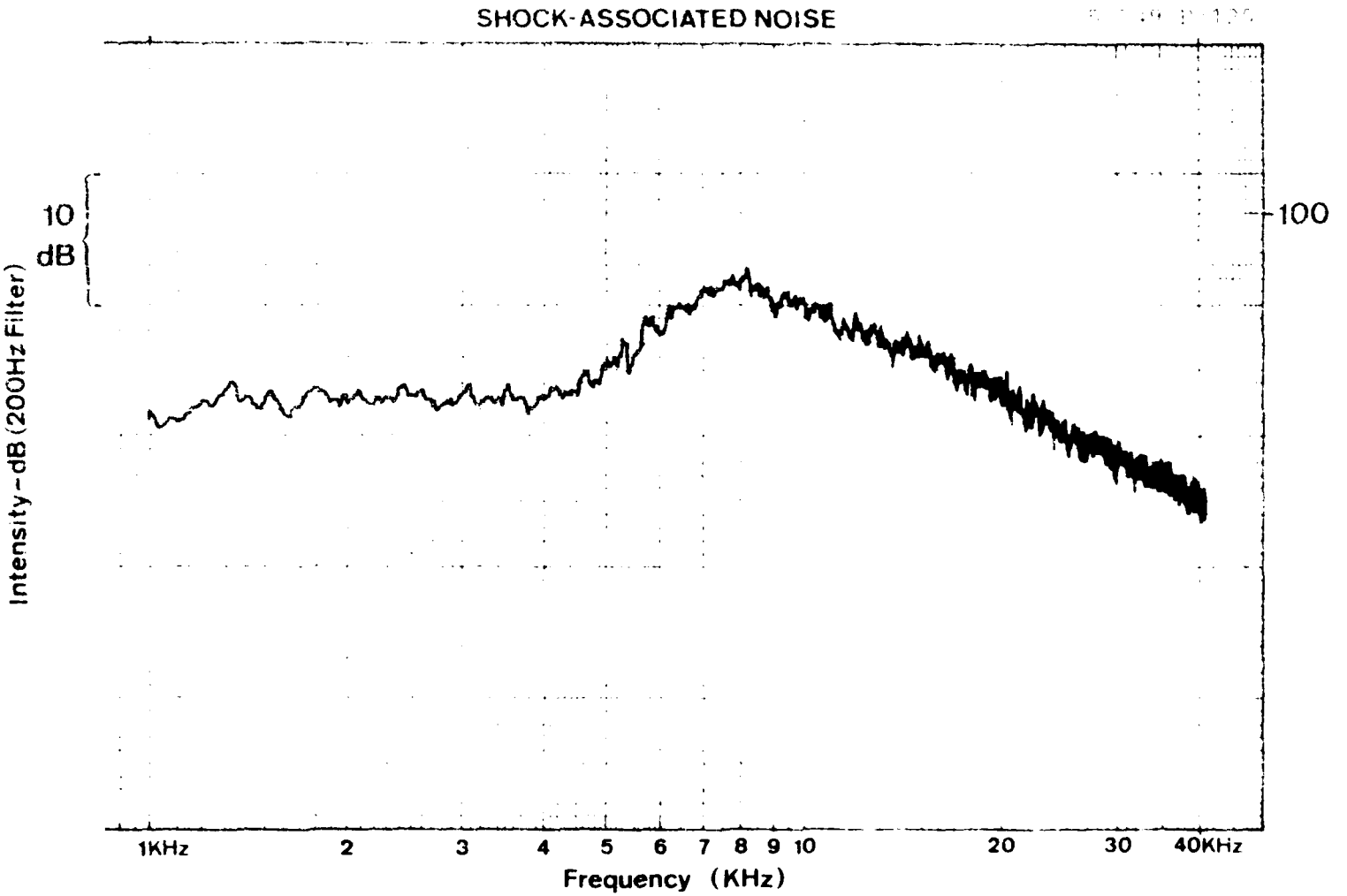
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
10
dB
100
Intensity - dB (200Hz Filter)
1KHz
2
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9
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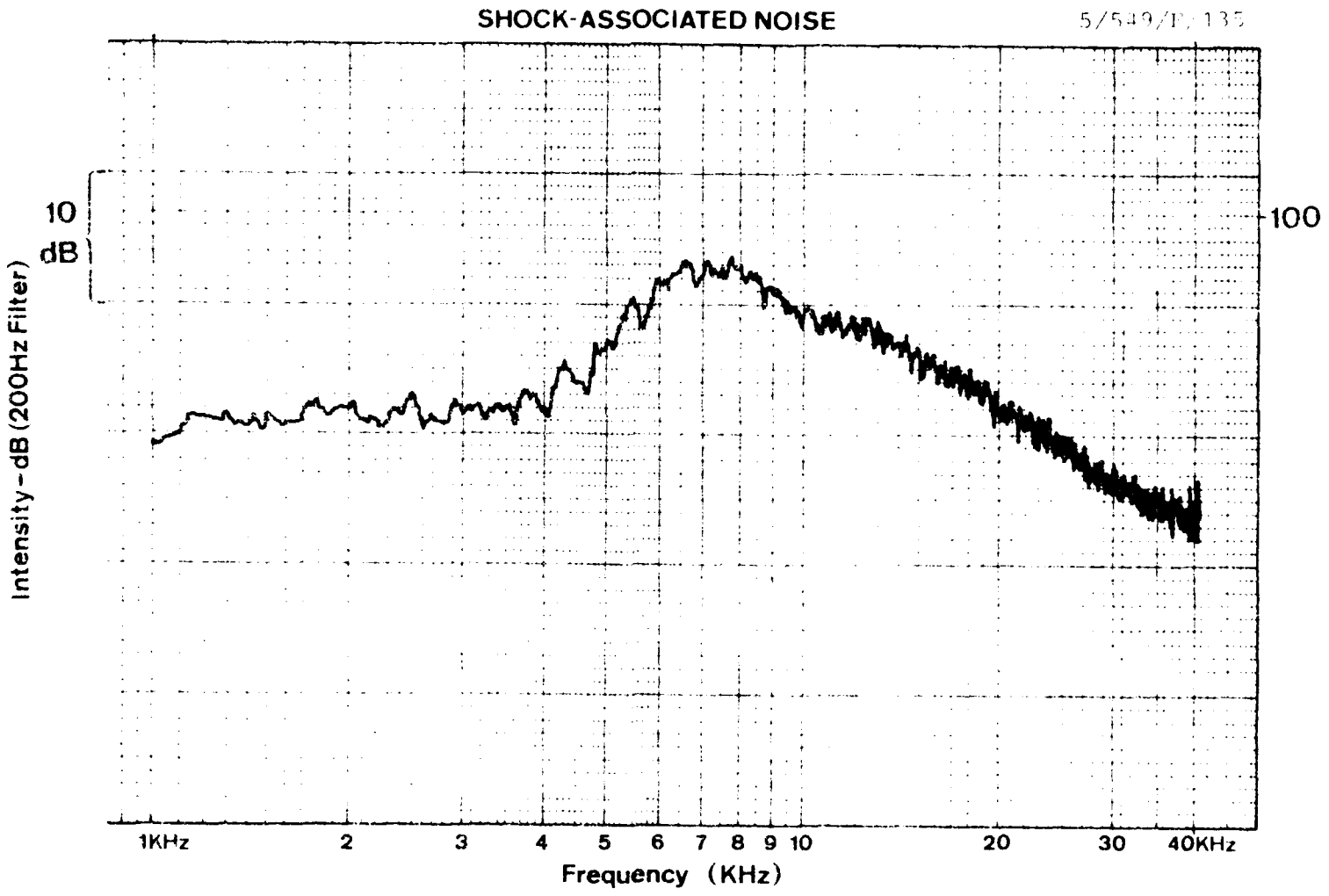
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
5/549/F, 135
10
dB
100
Intensity - dB (200Hz Filter)
1KHz
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9
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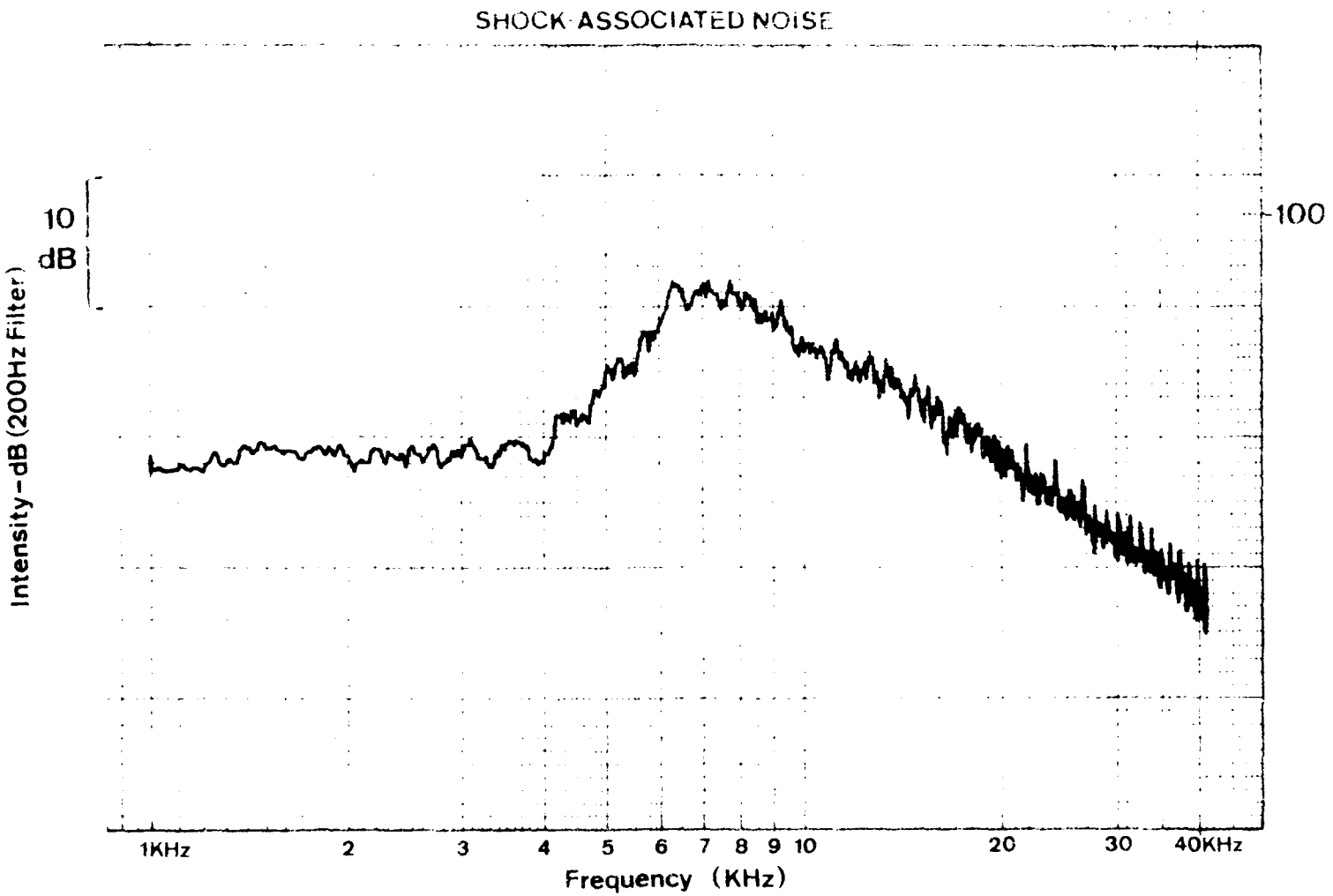
20
30
40KHz
Frequency (KHz)


SHOCK ASSOCIATED NOISE
10
dB
100
Intensity - dB (200Hz Filter)
1KHz
2
3
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20
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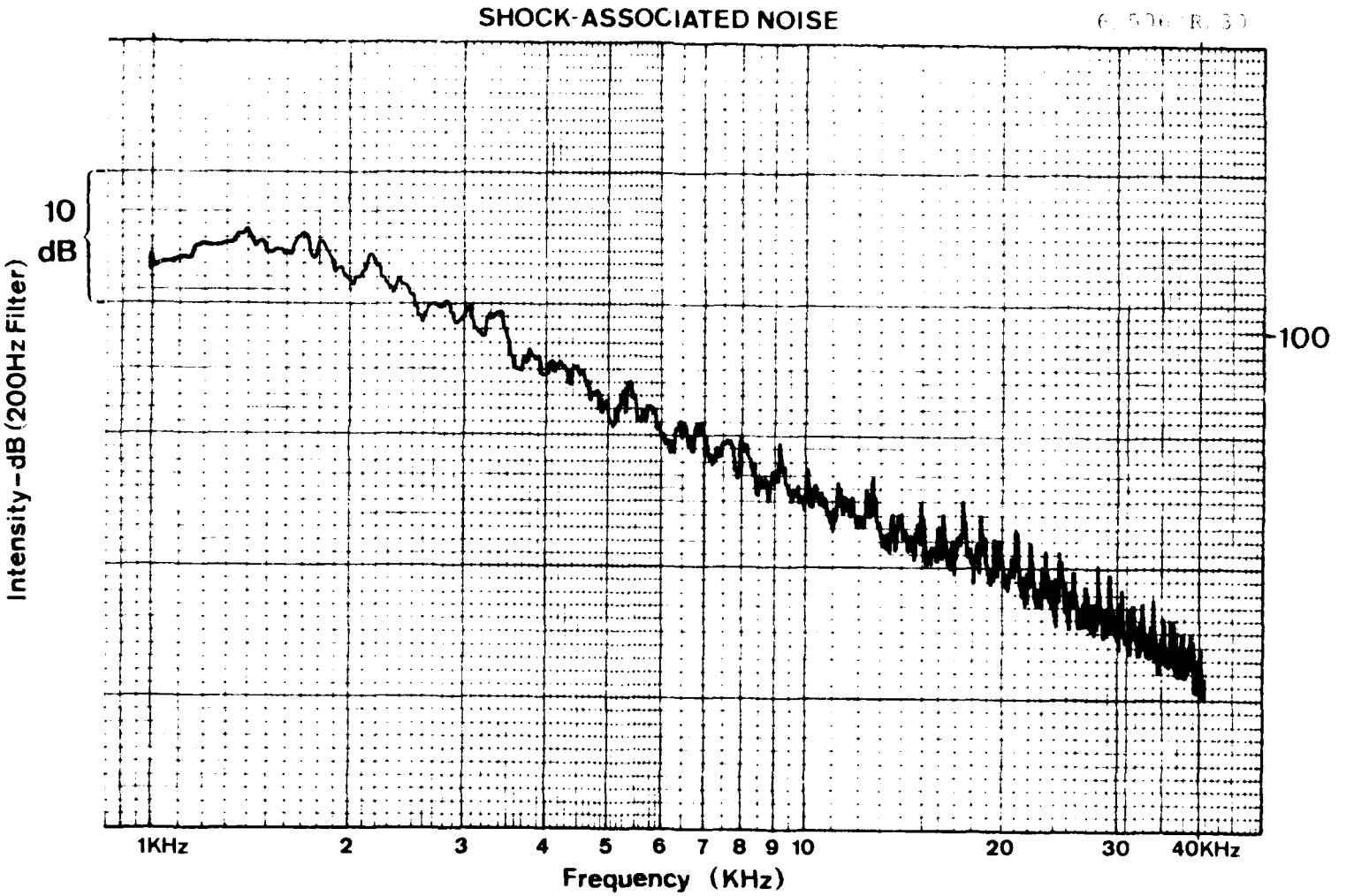
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
10
dB
Intensity-dB (200Hz Filter)
100
1KHz
2
3
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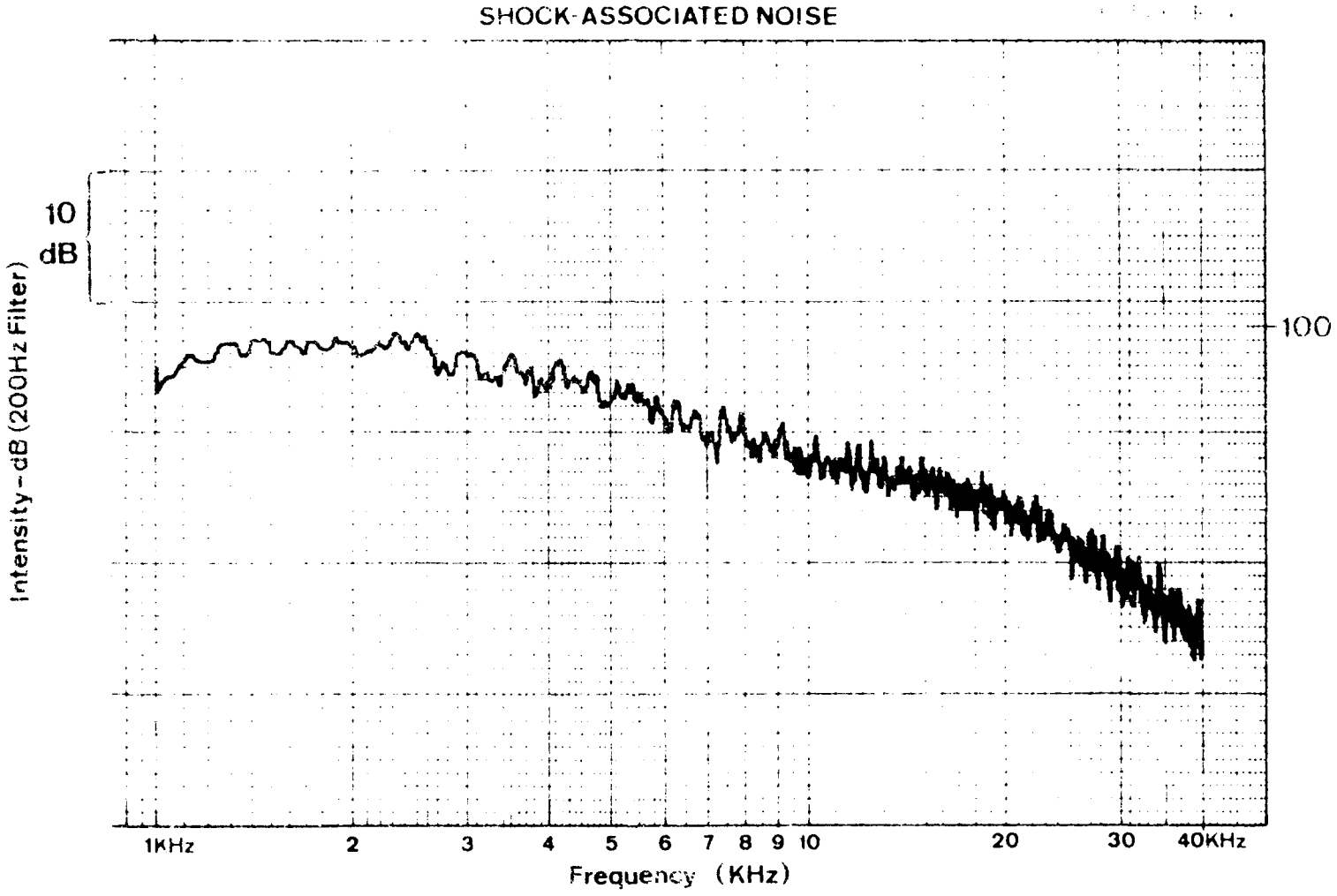
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
10
dB
Intensity - dB (200Hz Filter)
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1KHz
2
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9
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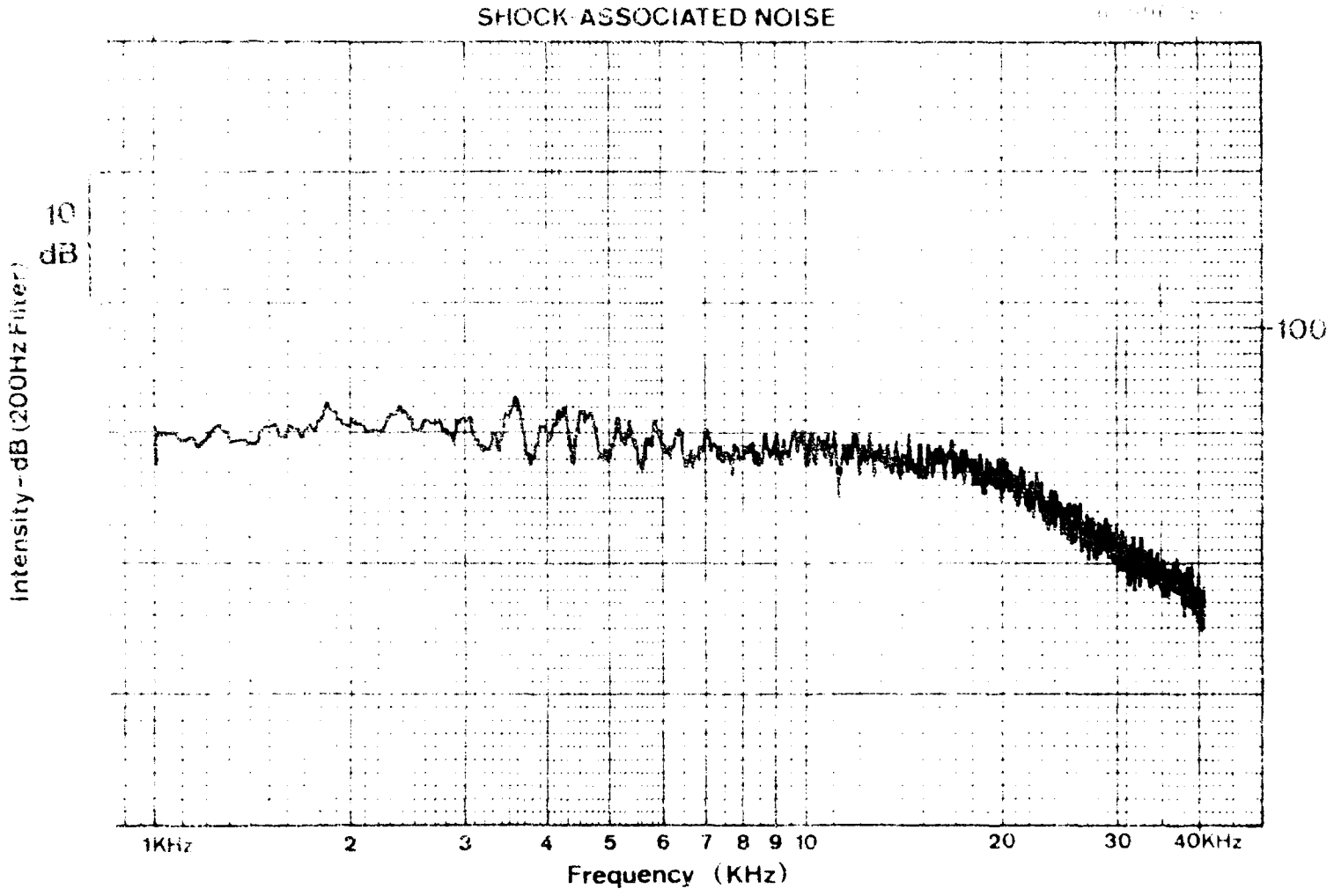
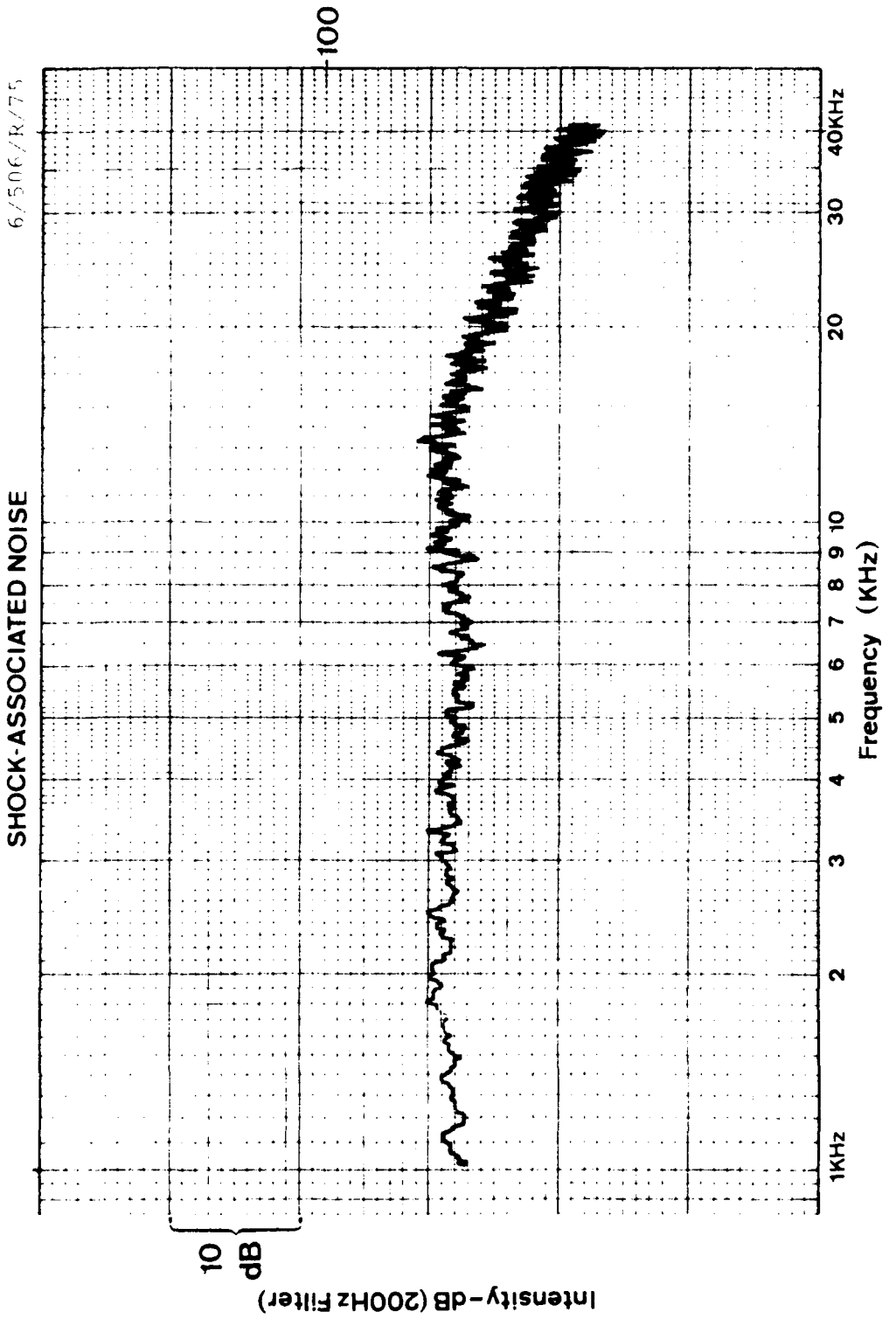
20
30
40KHz
Frequency (KHz)


SHOCK ASSOCIATED NOISE
10
dB
Intensity - dB (200Hz Filter)
100
1KHz
2
3
4
5
6
7
8
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
6/506/R/75
100
10 dB
Intensity – dB (200Hz Filter)
1KHz
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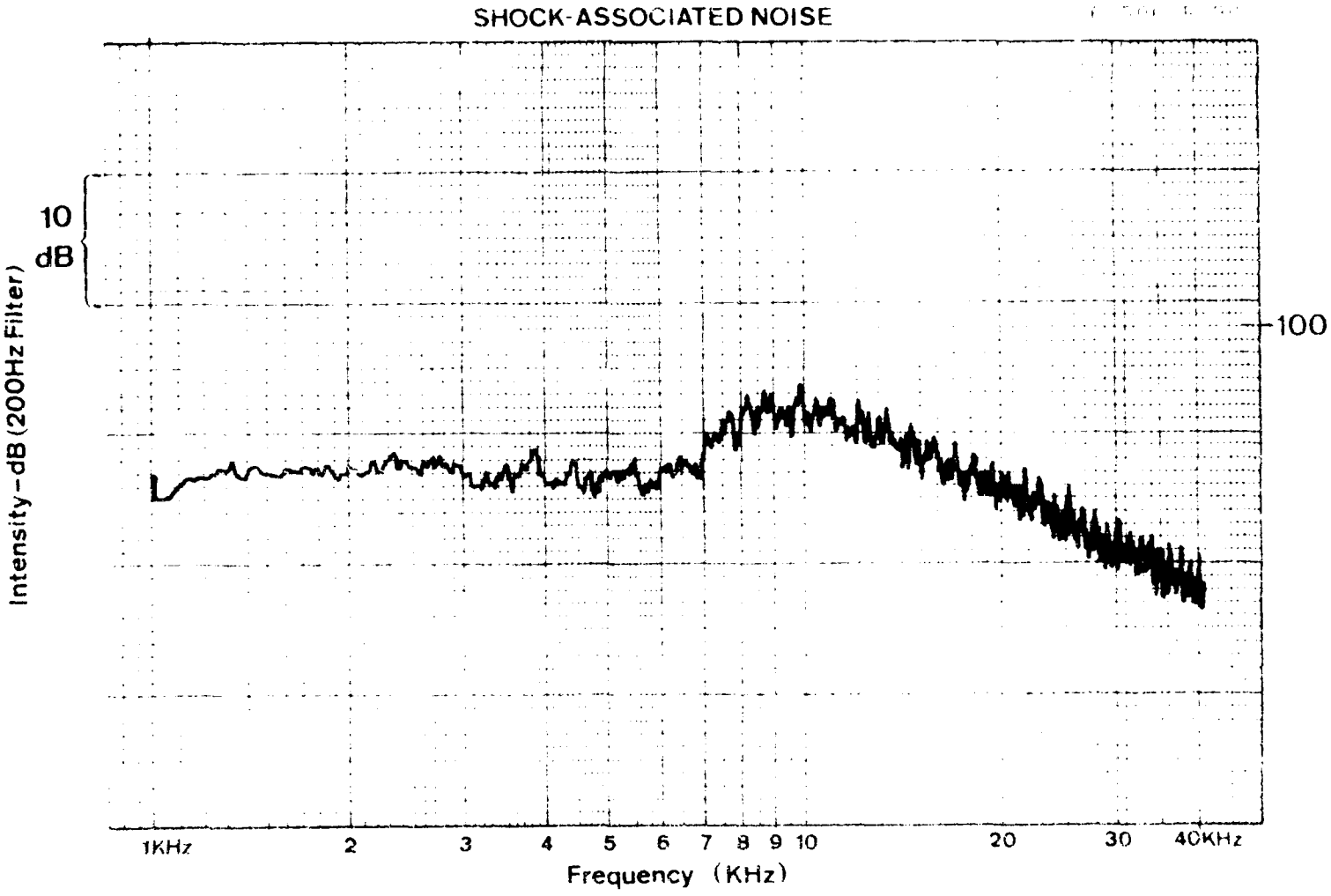
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
10
dB
Intensity–dB (200Hz Filter)
100
1KHz
2
3
4
5
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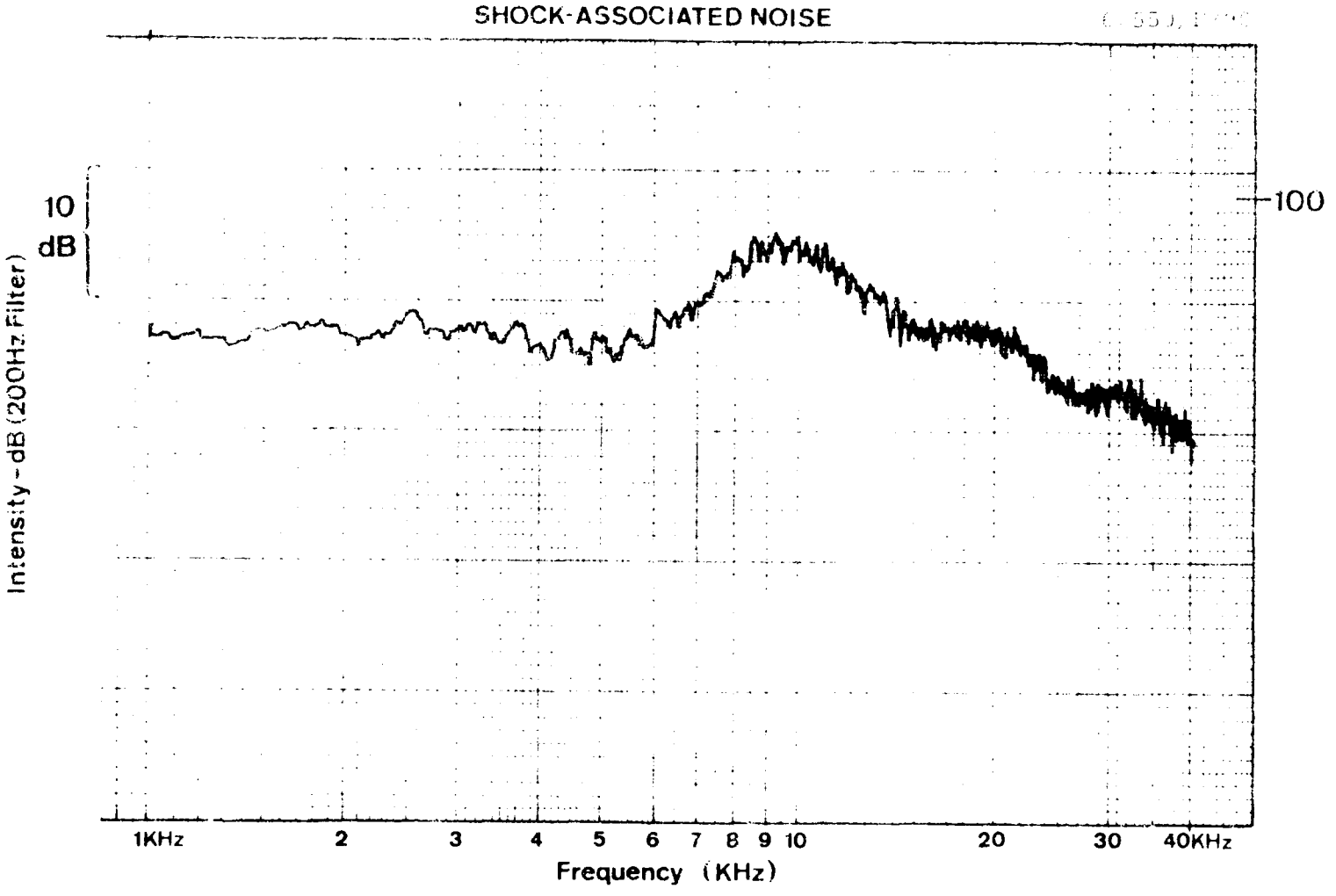
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
10
dB
100
Intensity - dB (200Hz Filter)
1KHz
2
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9
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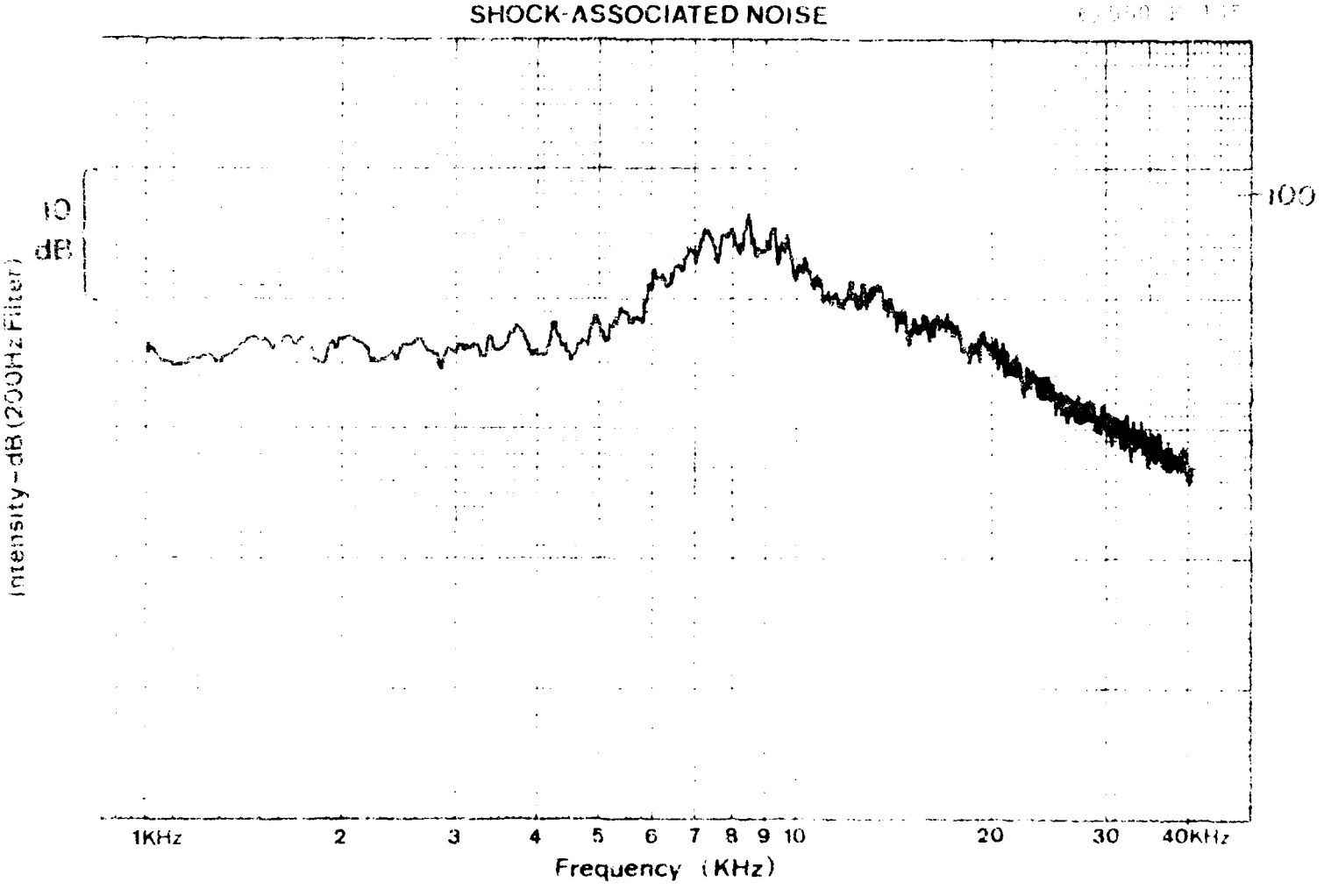
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
10
dB
100
Intensity - dB (200Hz Filter)
1KHz
2
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4
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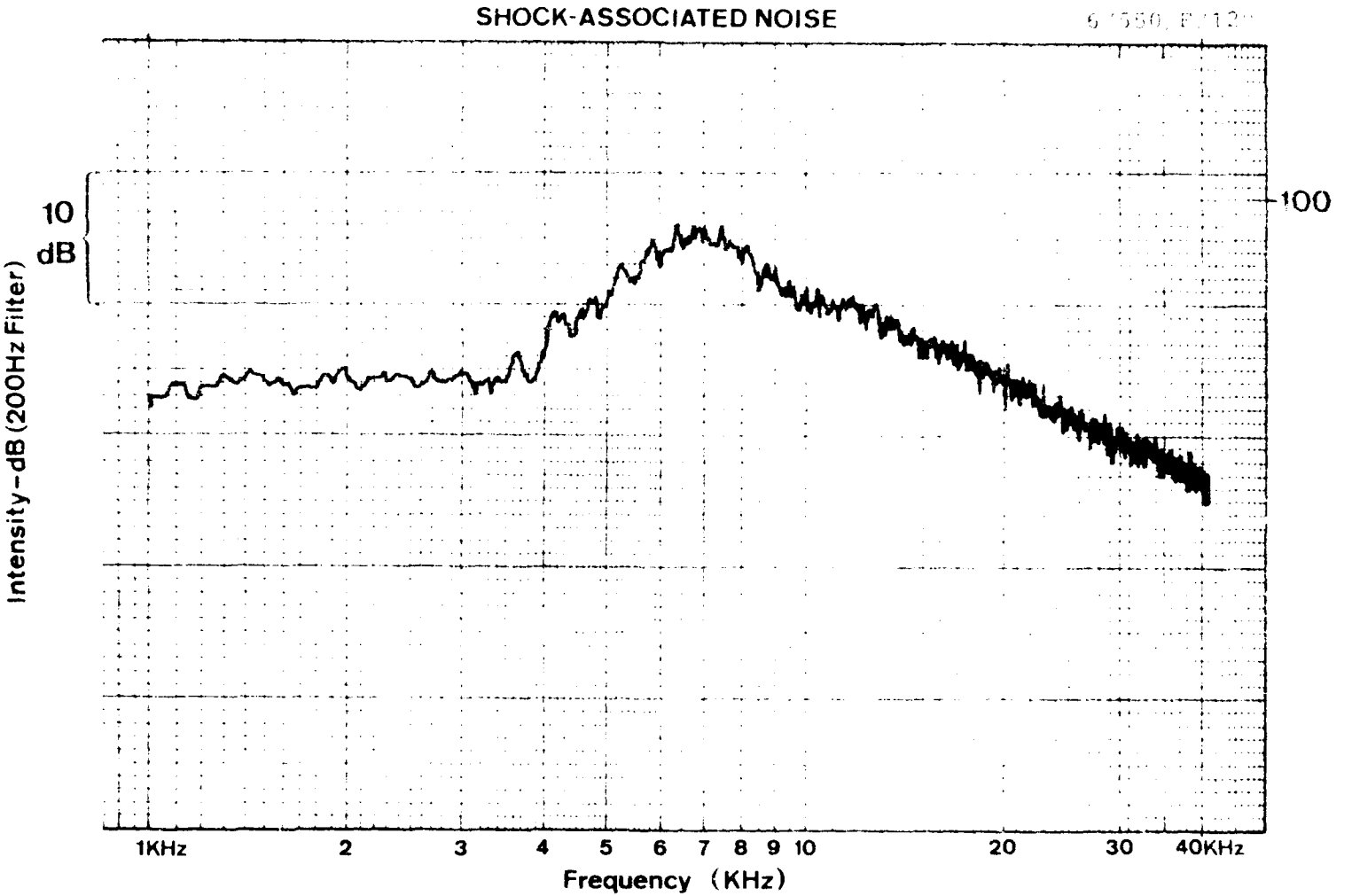
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
10
dB
100
Intensity-dB (200Hz Filter)
1KHz
2
3
4
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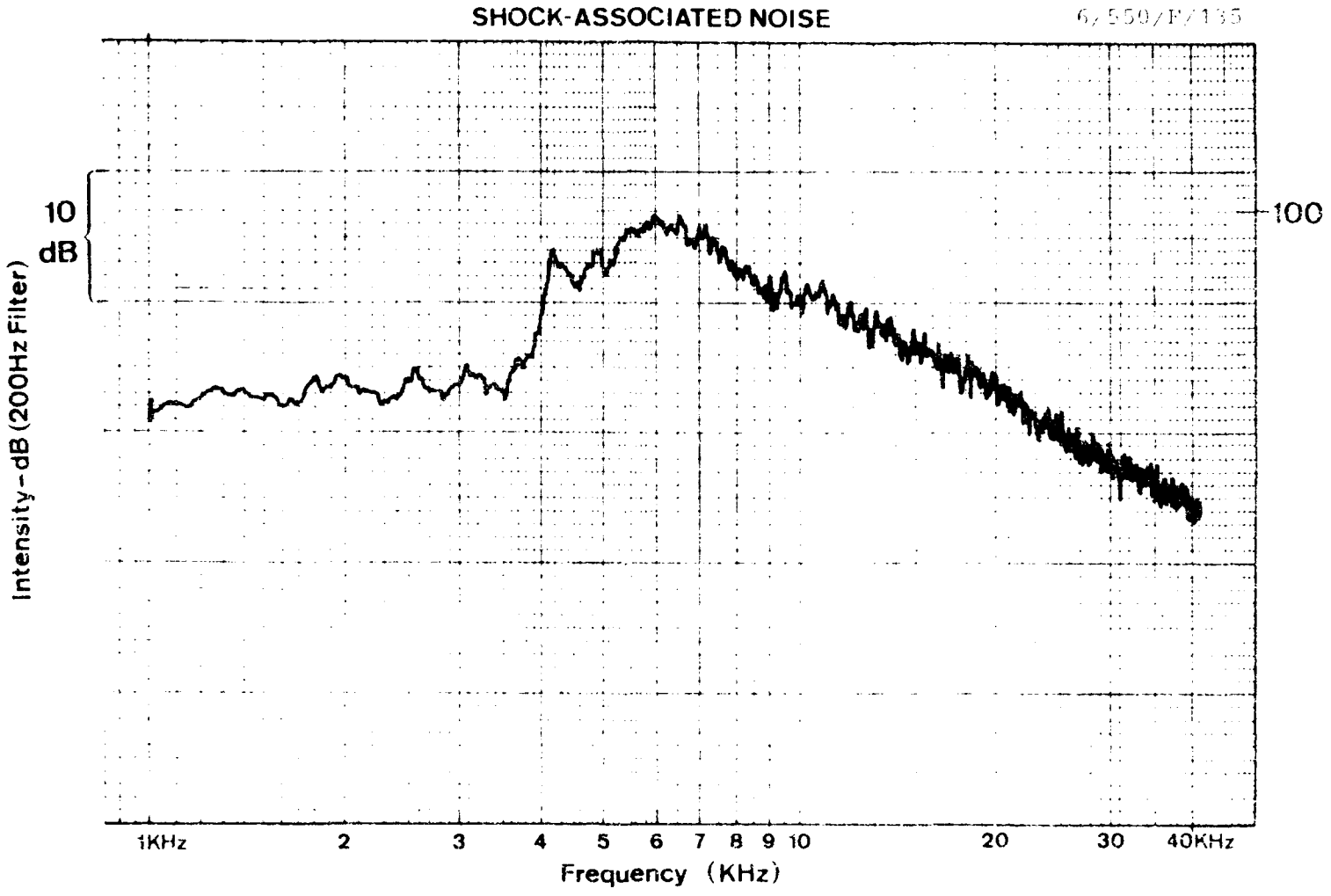
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
6,550/F/135
10
dB
100
Intensity - dB (200Hz Filter)
1KHz
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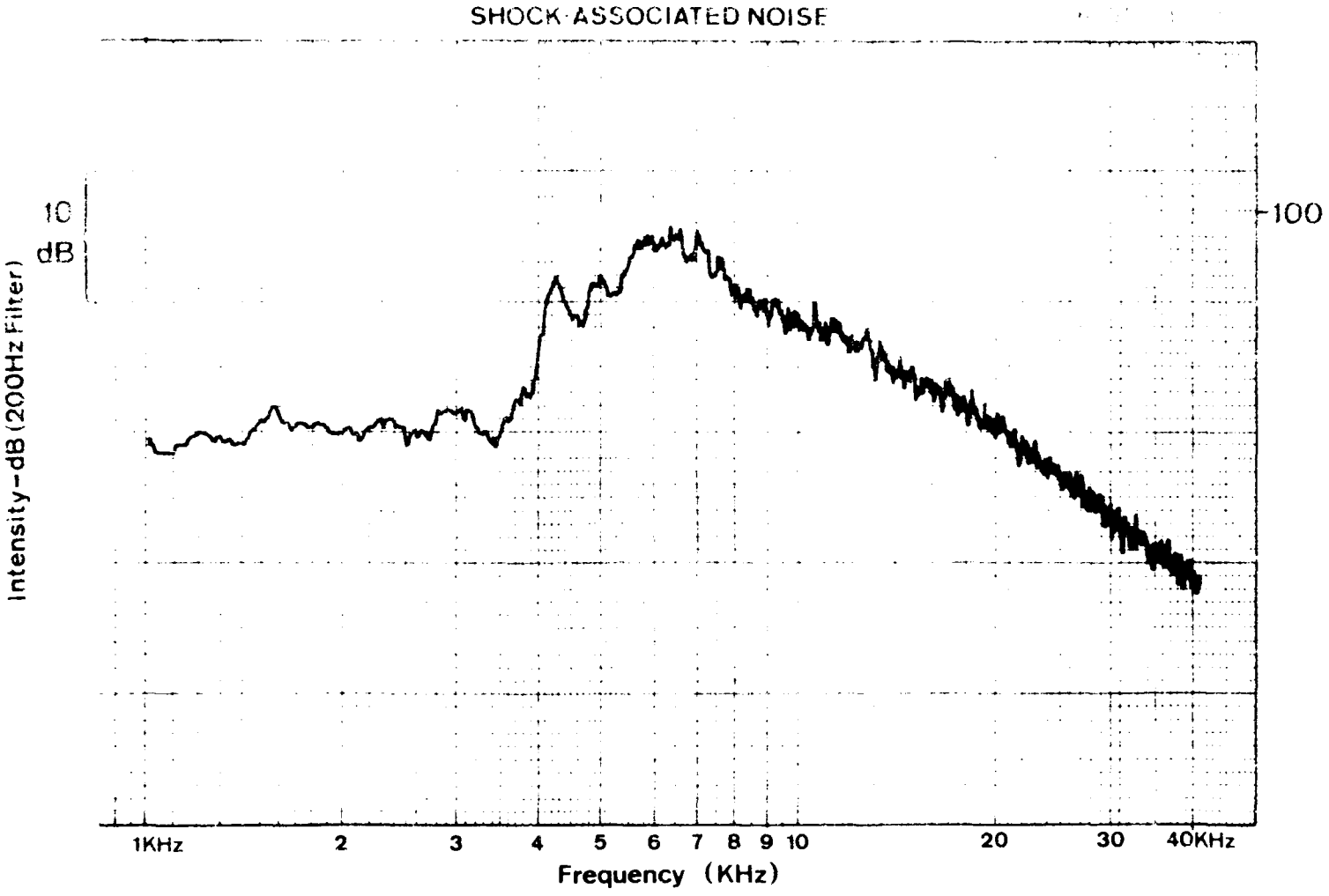
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
10
dB
100
Intensity-dB (200Hz Filter)
1KHz
2
3
4
5
6
7
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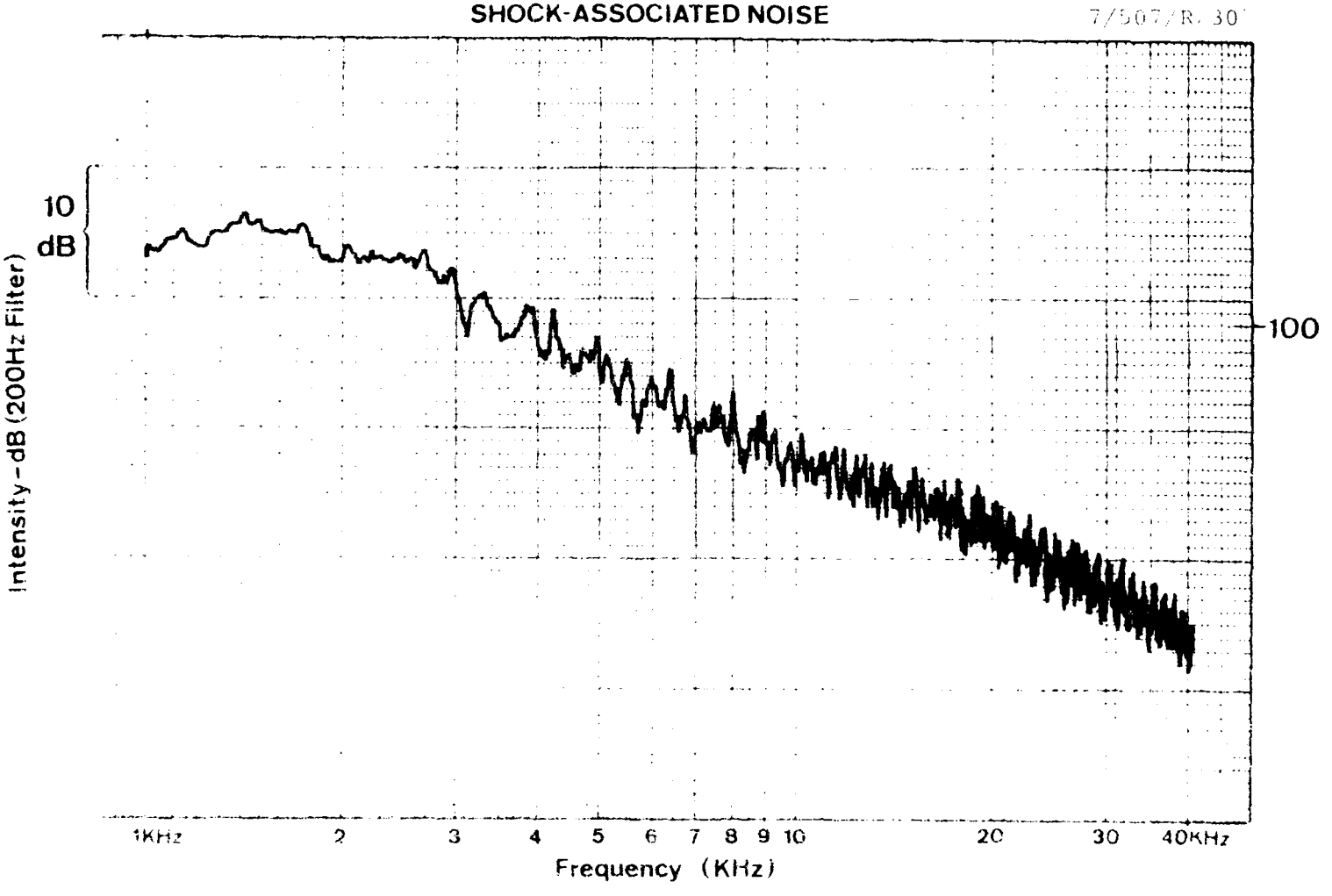
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
7/507/R. 30
10
dB
Intensity - dB (200Hz Filter)
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1KHz
2
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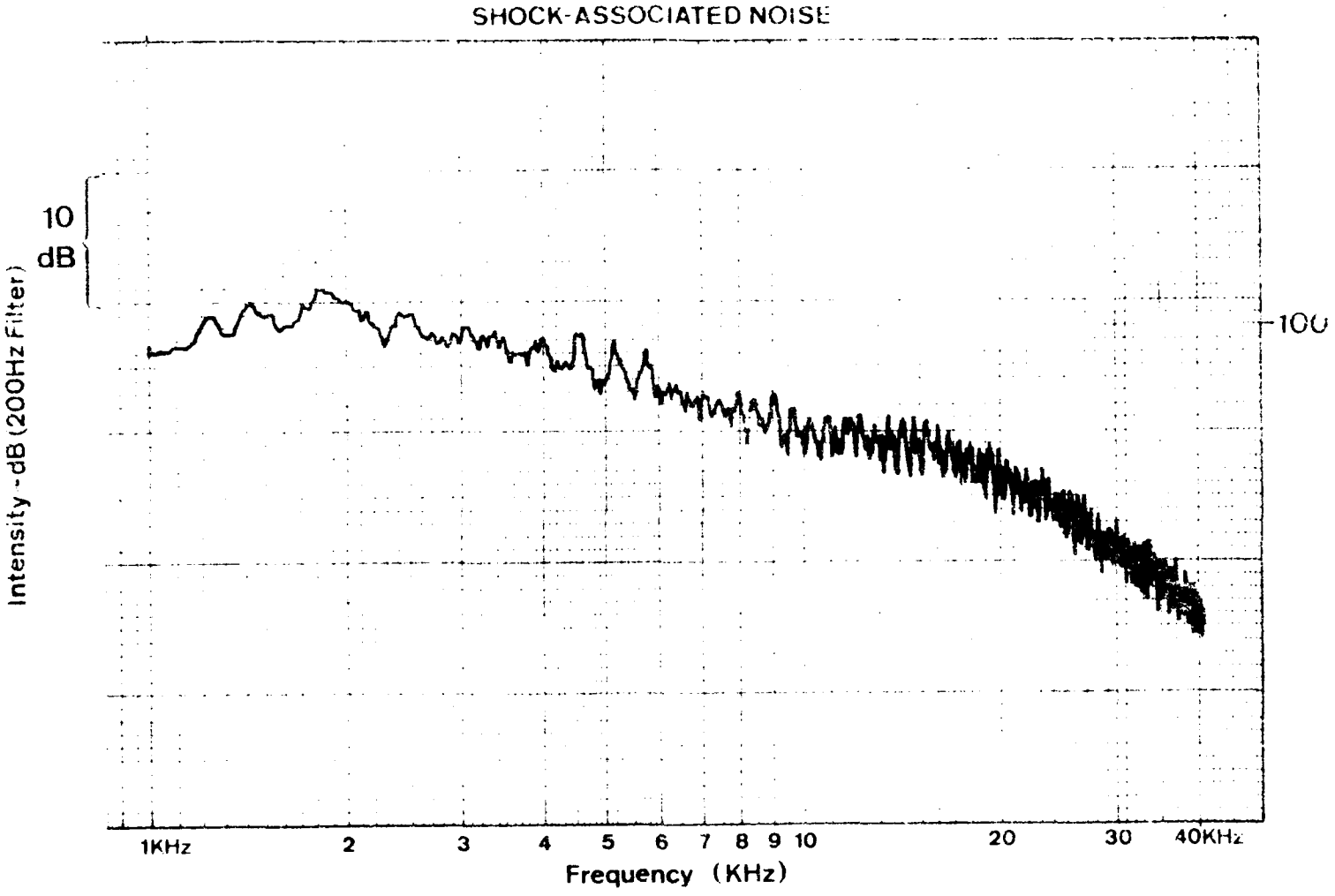
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
10
dB
Intensity - dB (200Hz Filter)
100
1KHz
2
3
4
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7
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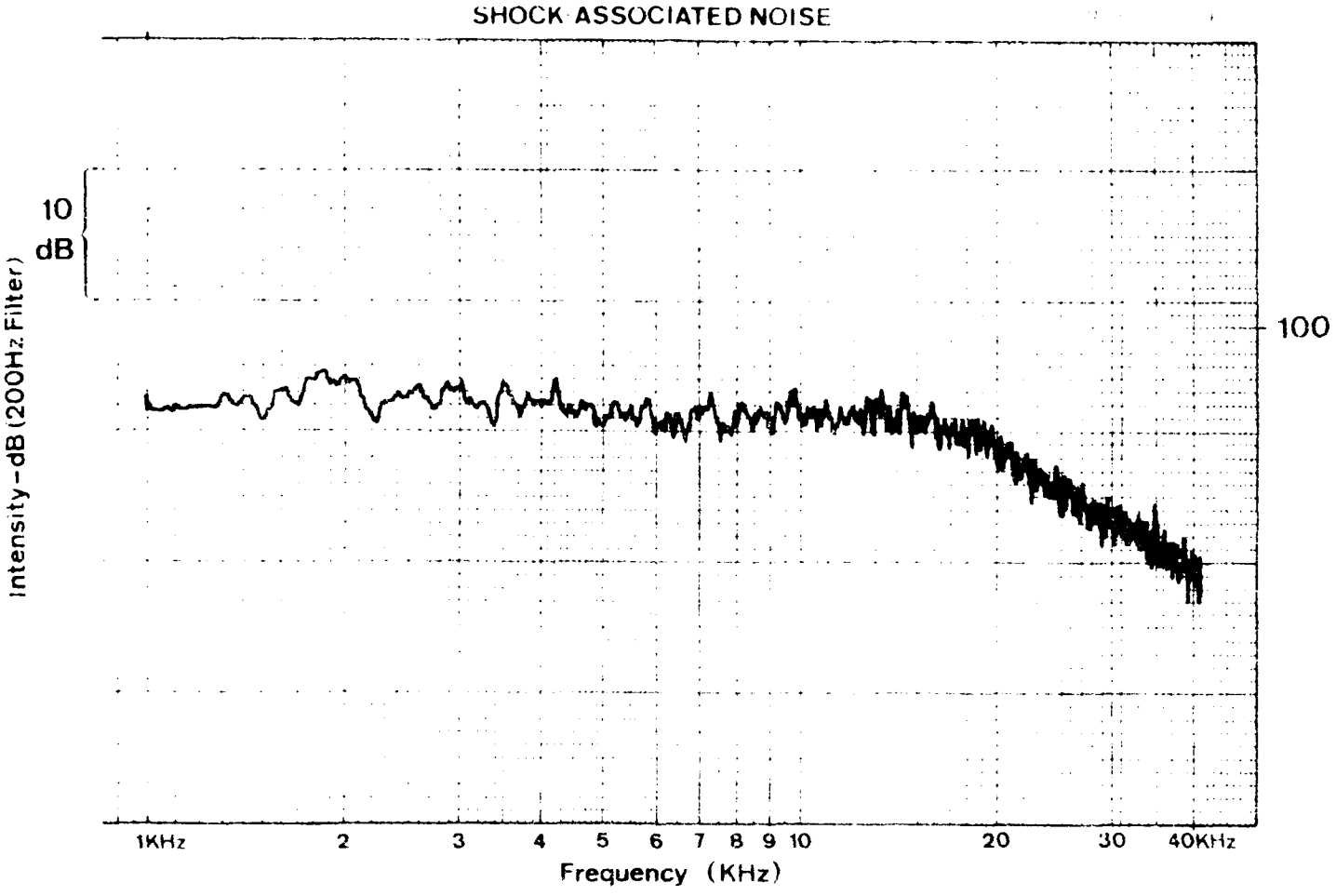
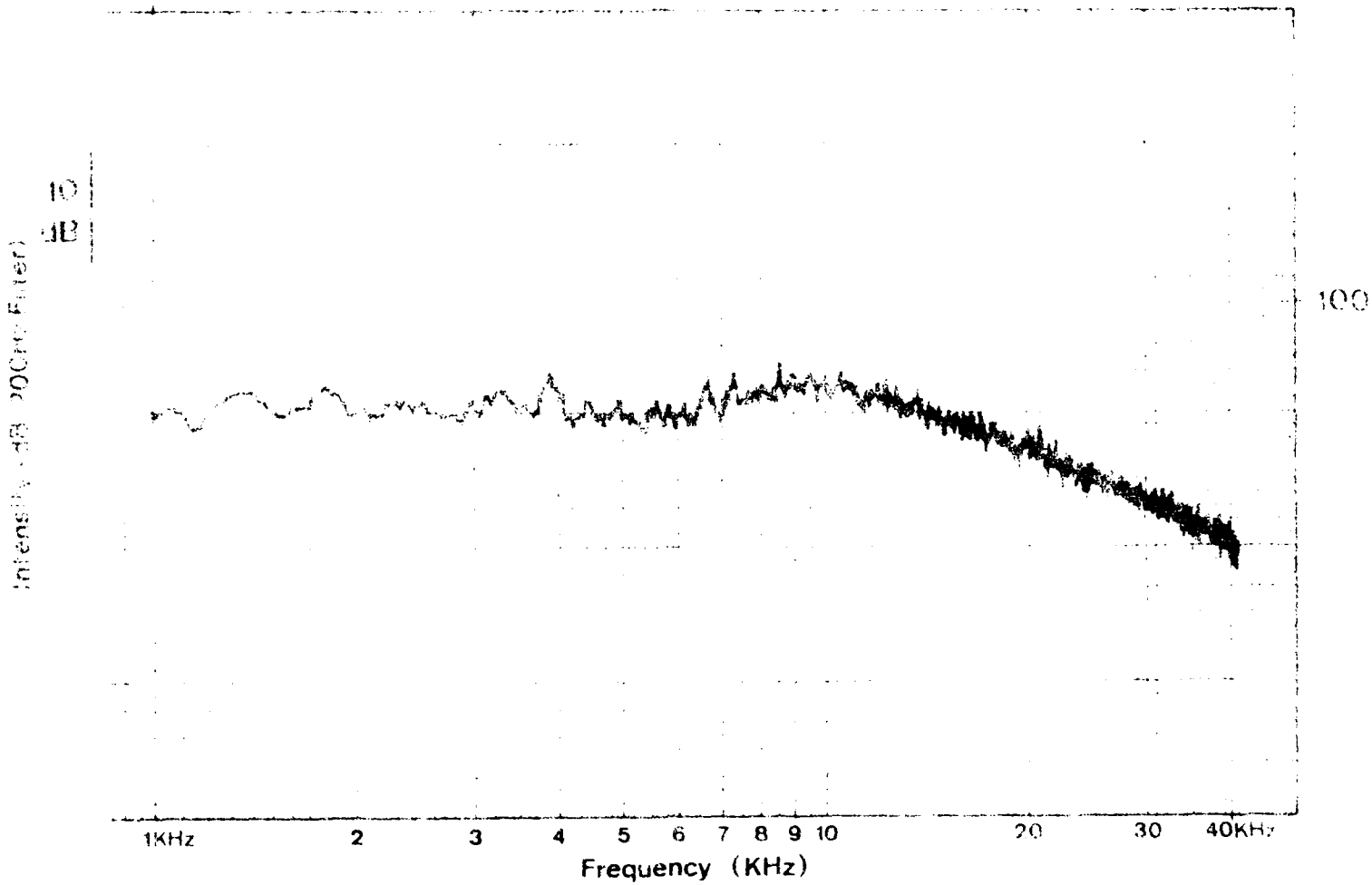
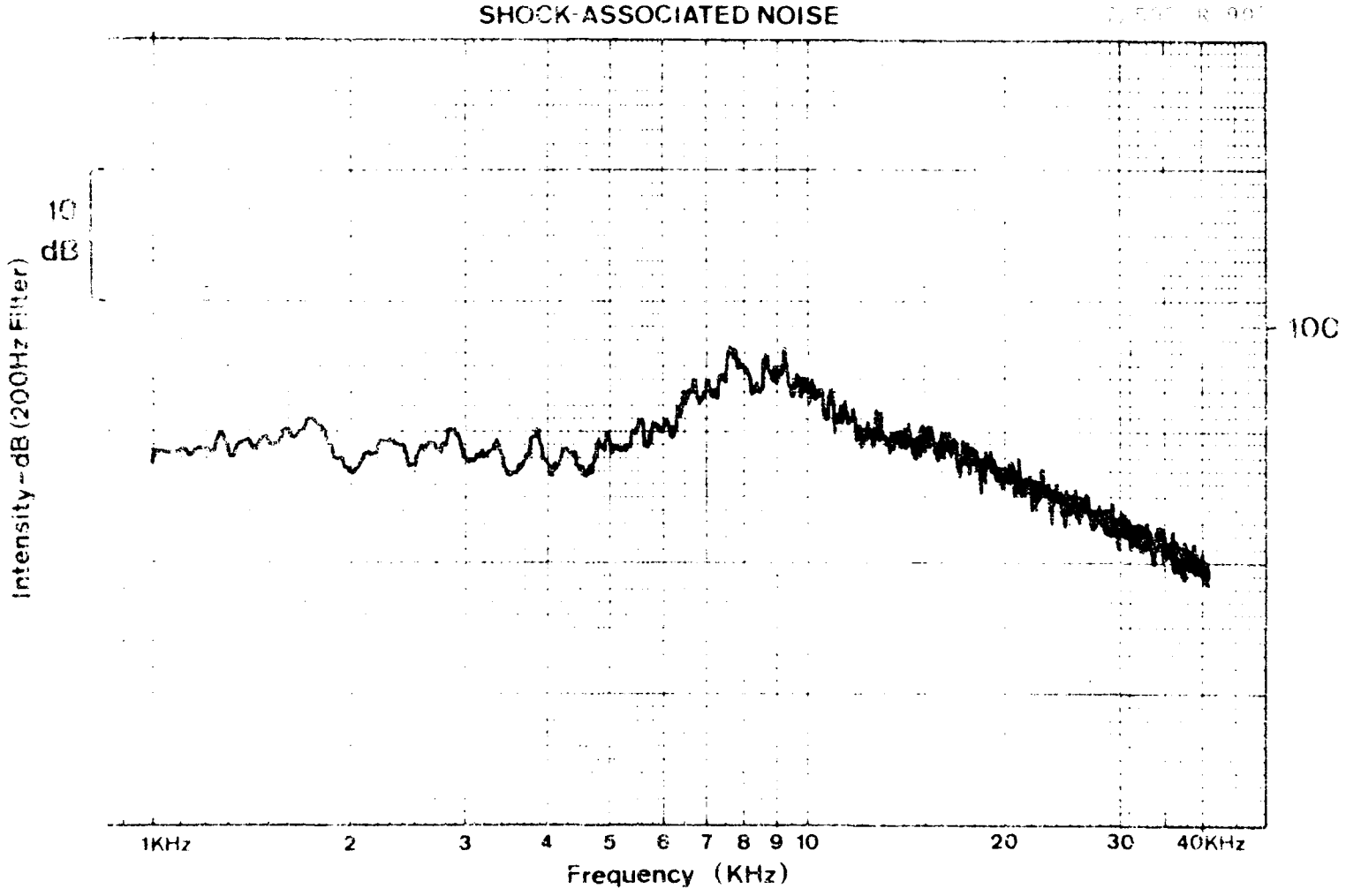
9
10
20
30
40KHz
Frequency (KHz)


SHOCK ASSOCIATED NOISE
10
dB
Intensity - dB (200Hz Filter)
100
1KHz
2
3
4
5
6
7
8
9
10
20
30
40KHz
Frequency (KHz)

SHOCK ASSOCIATED NOISE




SHOCK-ASSOCIATED NOISE
10
dB
100
Intensity - dB (200Hz Filter)
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2
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4
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10
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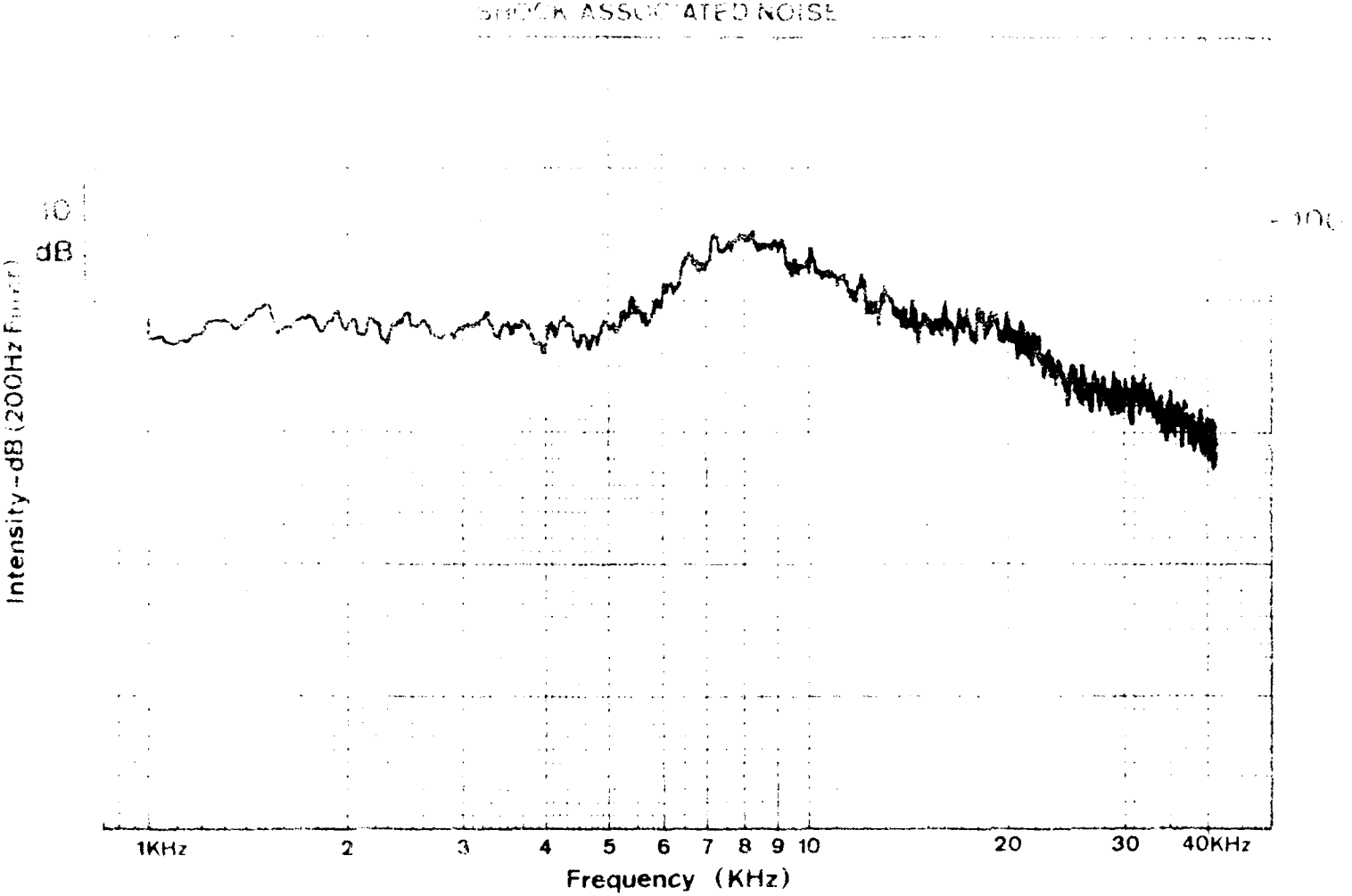
30
40KHz
Frequency (KHz)


SHOCK ASSOCIATED NOISE
10
dB
Intensity - dB (200Hz Band)
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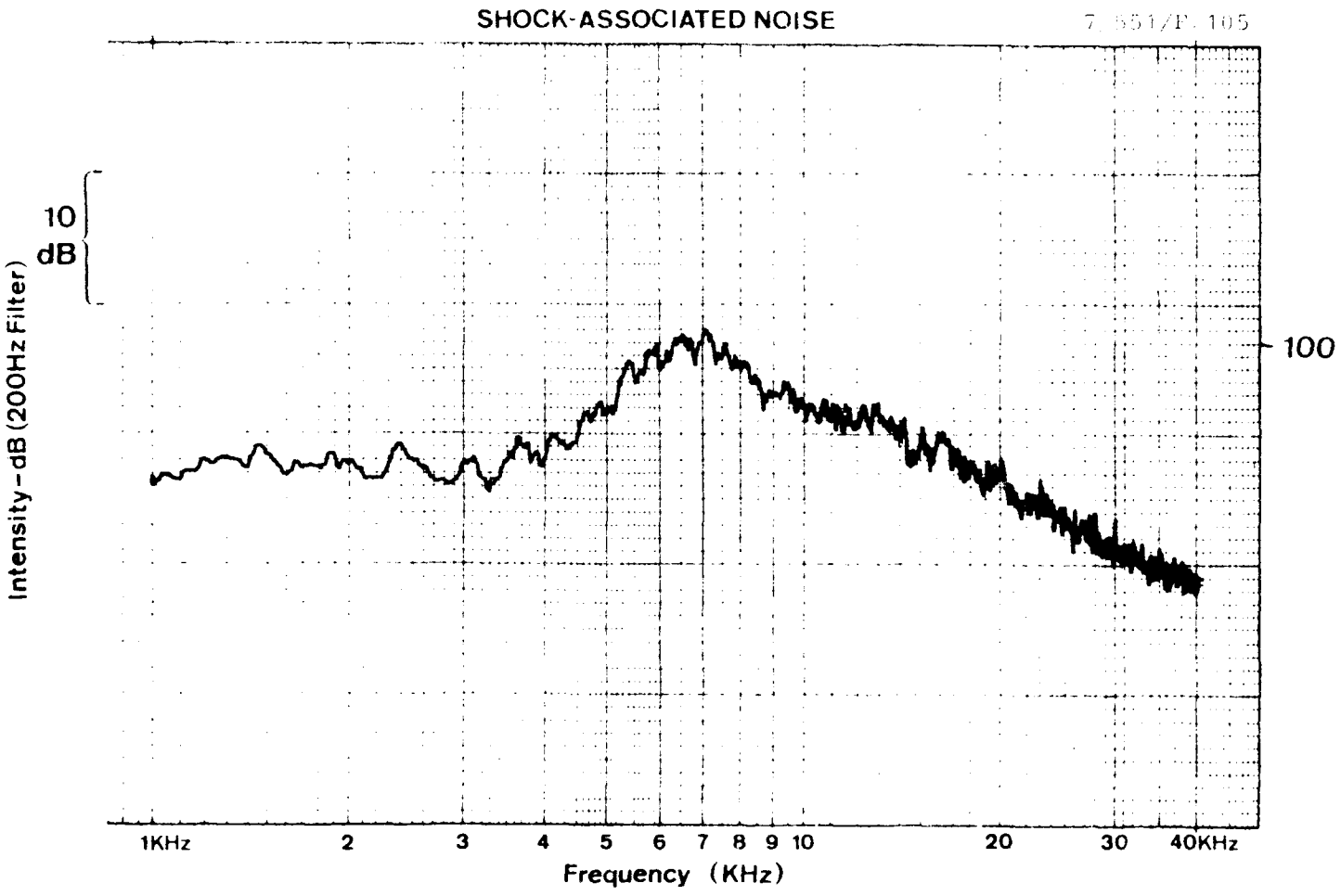
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
7 551/F 105
10
dB
Intensity - dB (200Hz Filter)
100
1KHz
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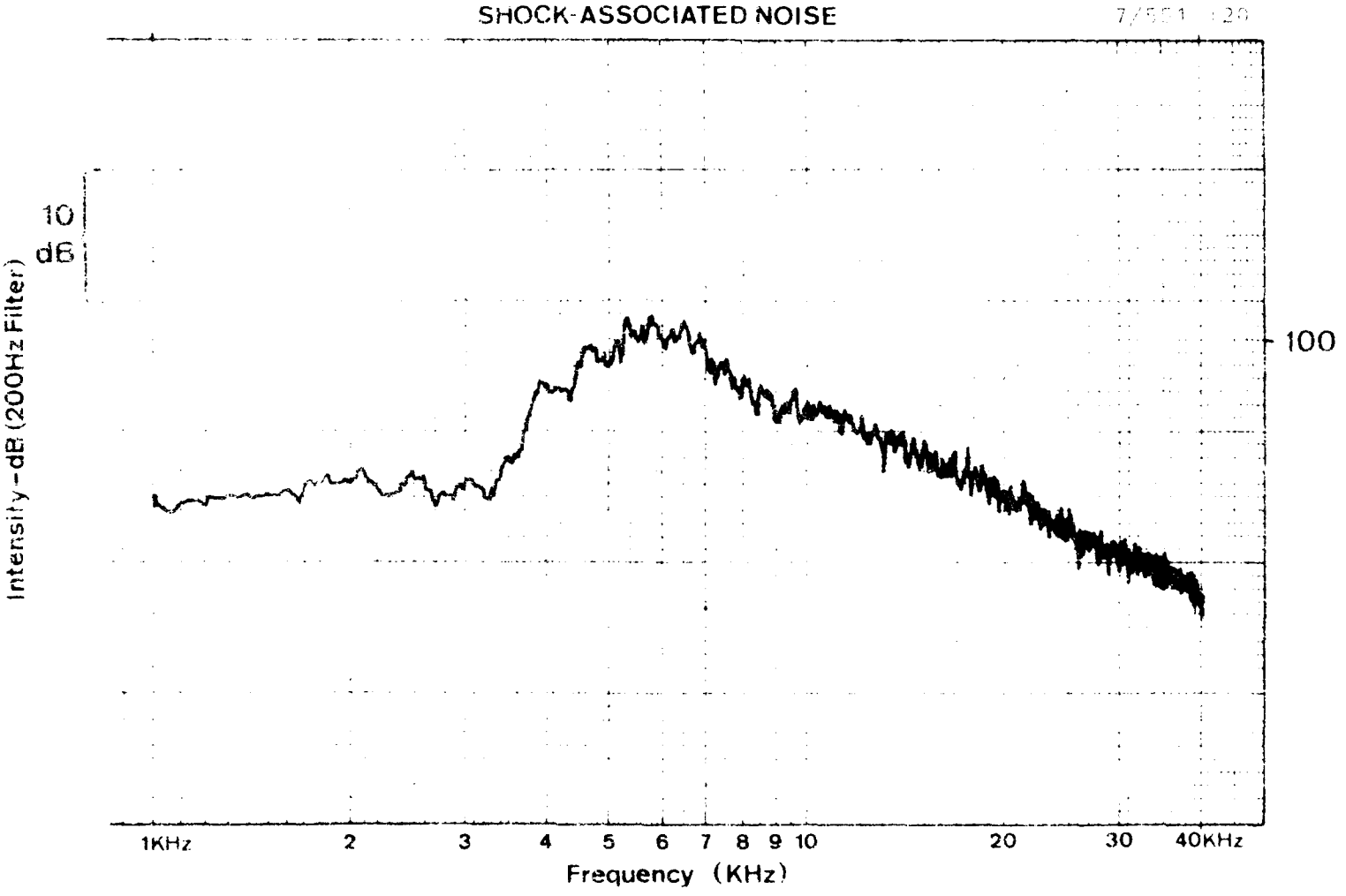
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
10
dB
Intensity - dB (200Hz Filter)
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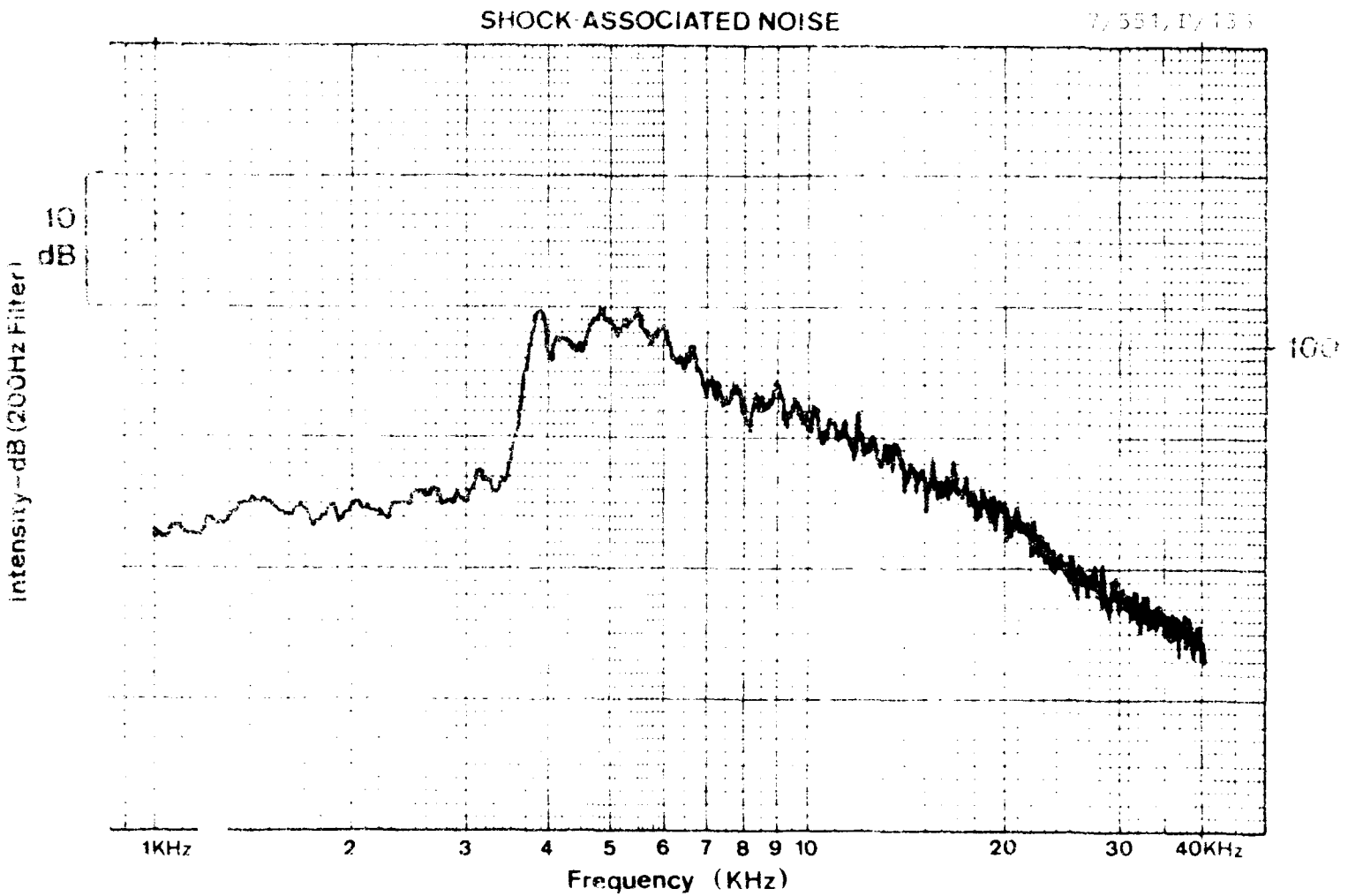
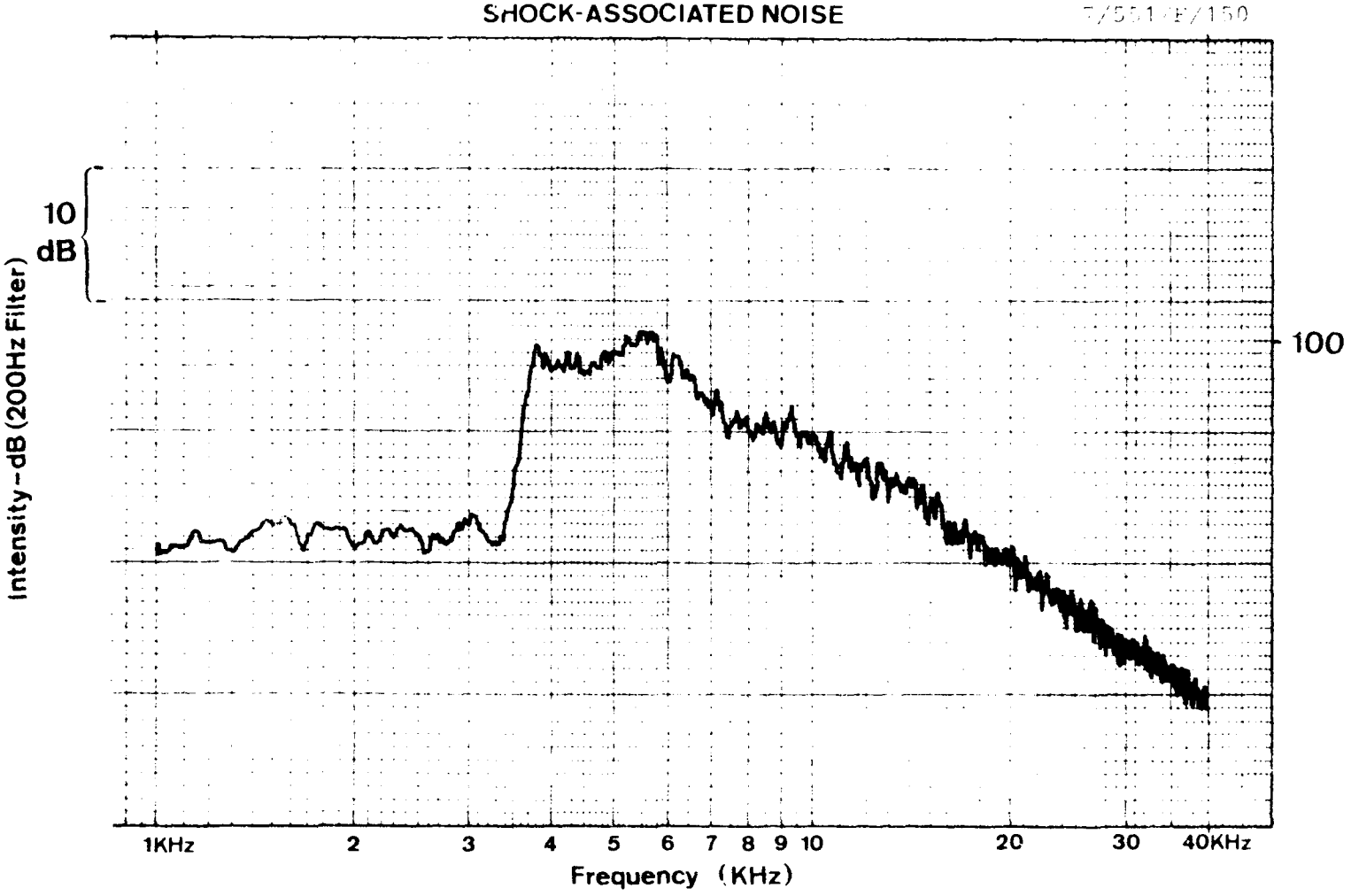
2
3
4
5
6
7
8
9
10
20
30
40KHz
Frequency (KHz)


SHOCK ASSOCIATED NOISE
10 dB
Intensity - dB (200Hz Filter)
100
1KHz
2
3
4
5
6
7
8
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
T/551/E/150
10
dB
Intensity - dB (200Hz Filter)
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1KHz
2
3
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9
10
20
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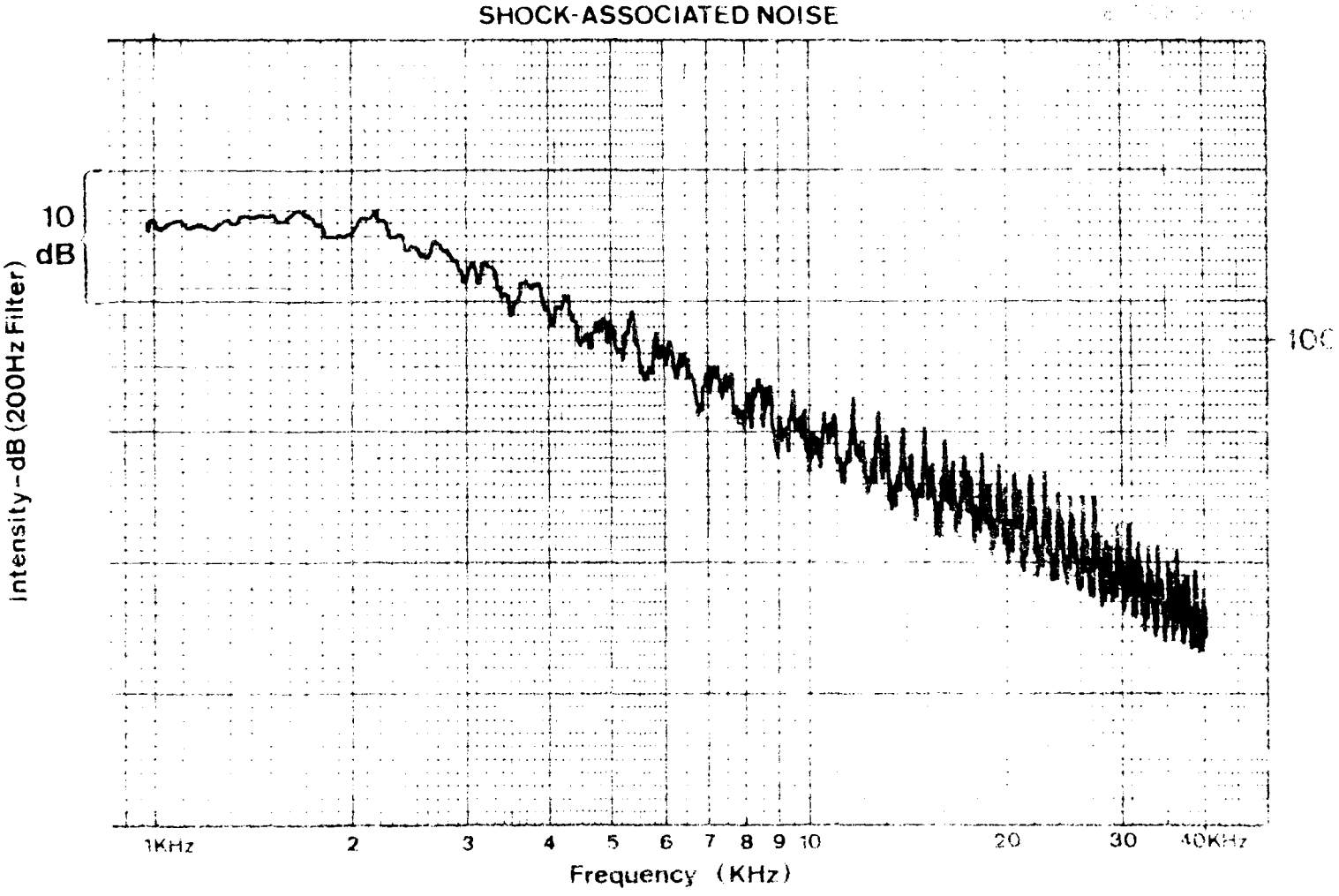
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
10
dB
Intensity - dB (200Hz Filter)
1KHz
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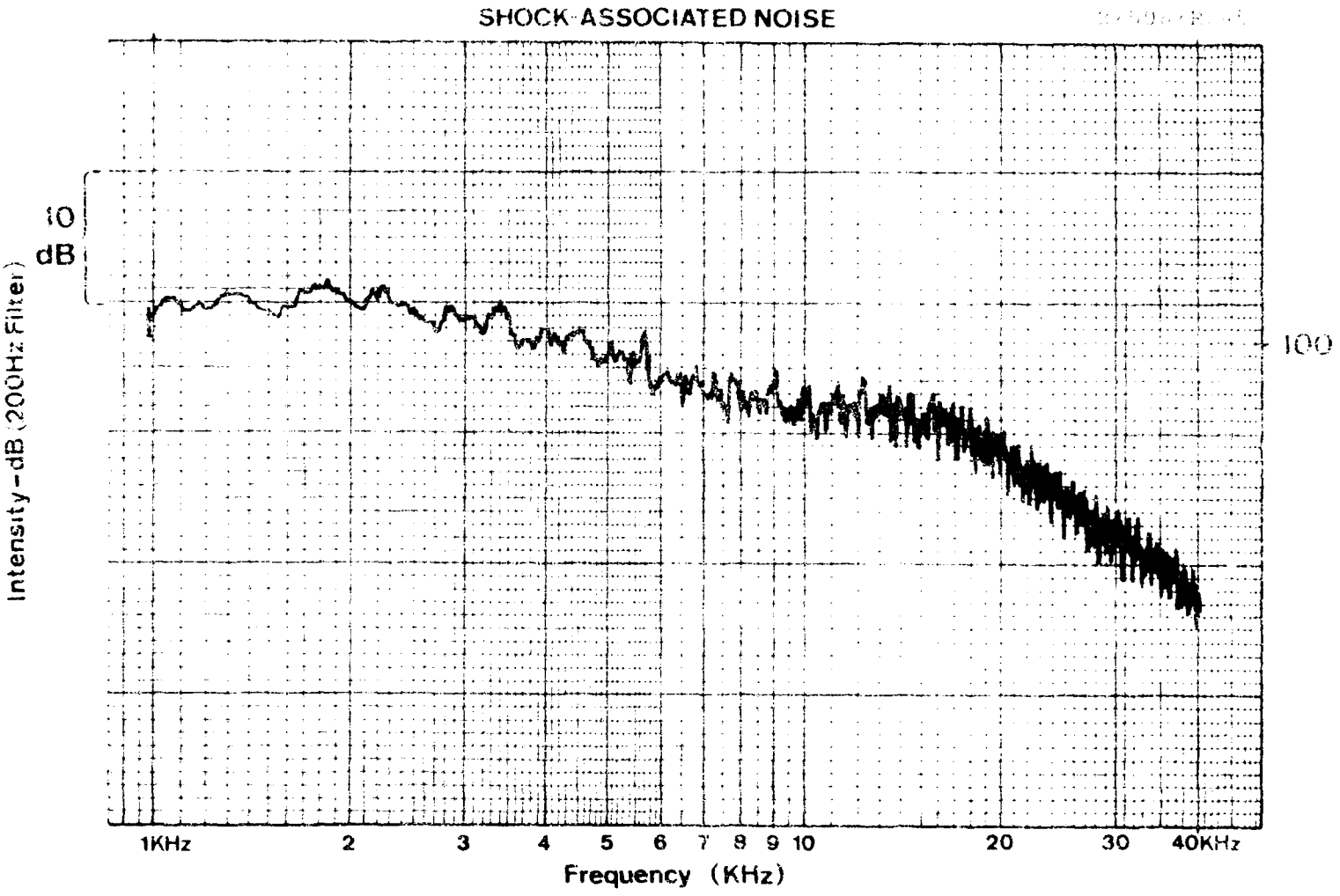
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
10
dB
Intensity-dB (200Hz Filter)
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1KHz
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9
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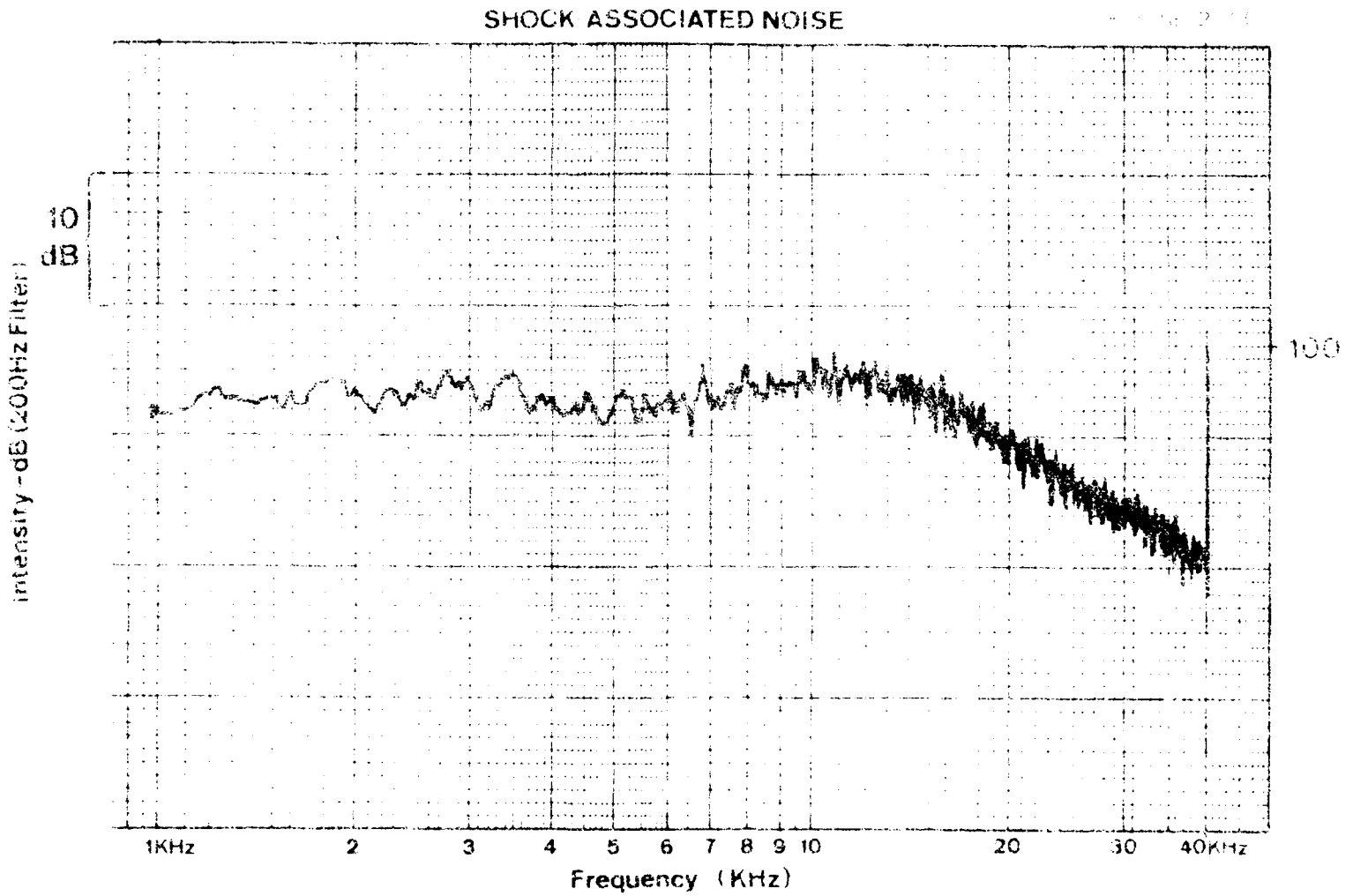
40KHz
Frequency (KHz)


SHOCK ASSOCIATED NOISE
10
dB
100
Intensity - dB (200Hz Filter)
1KHz
2
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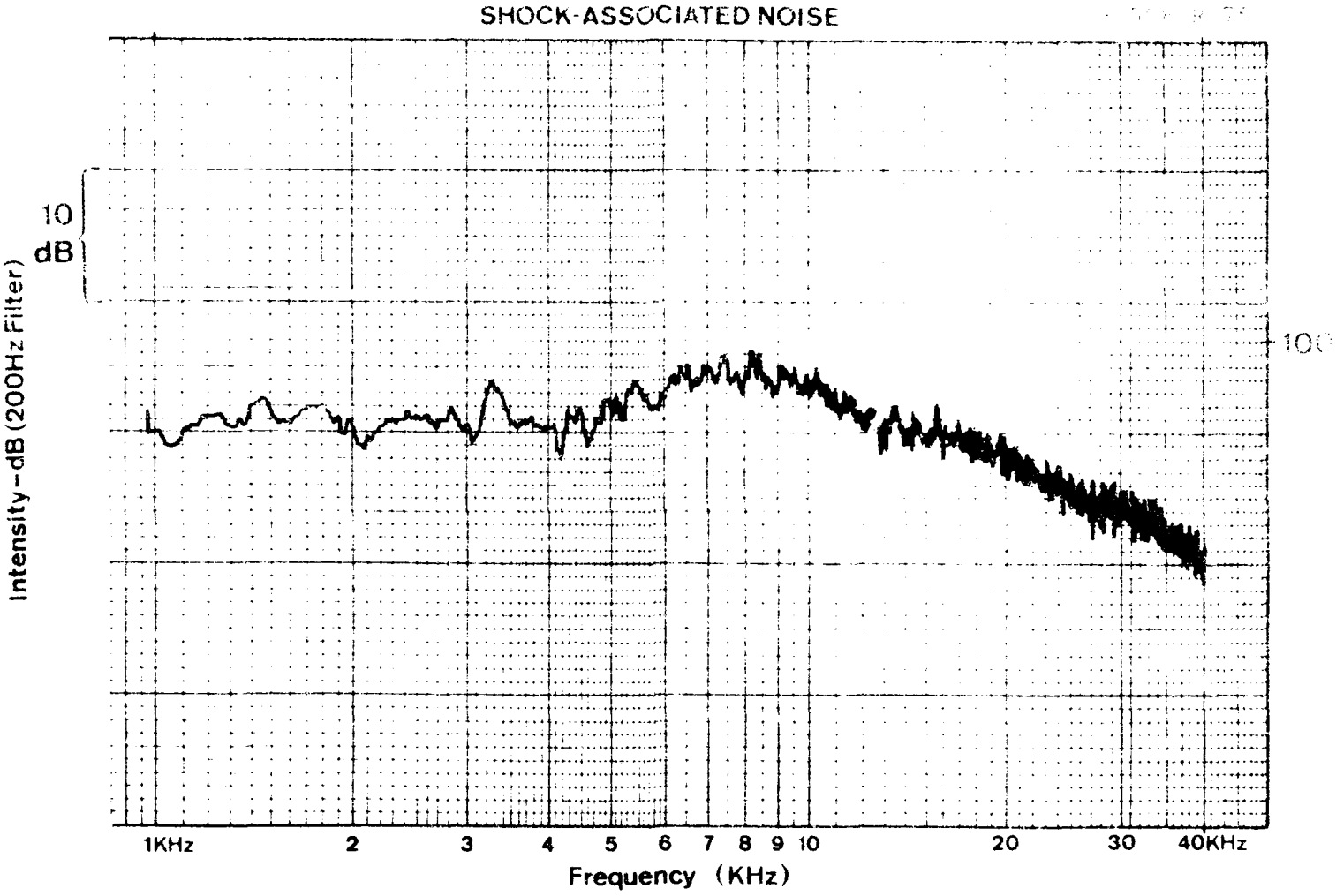
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
10
dB
Intensity - dB (200Hz Filter)
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1KHz
2
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4
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9
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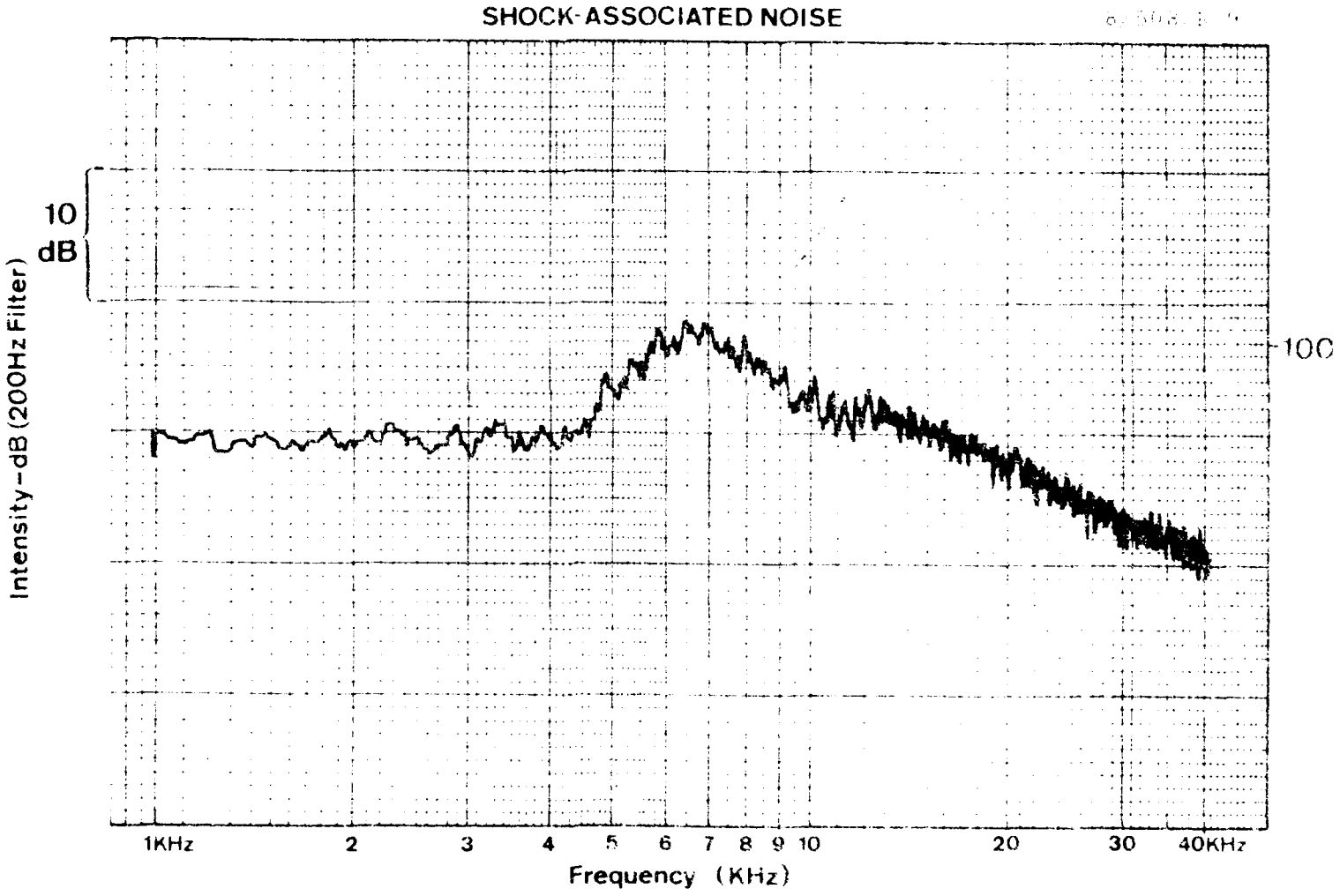
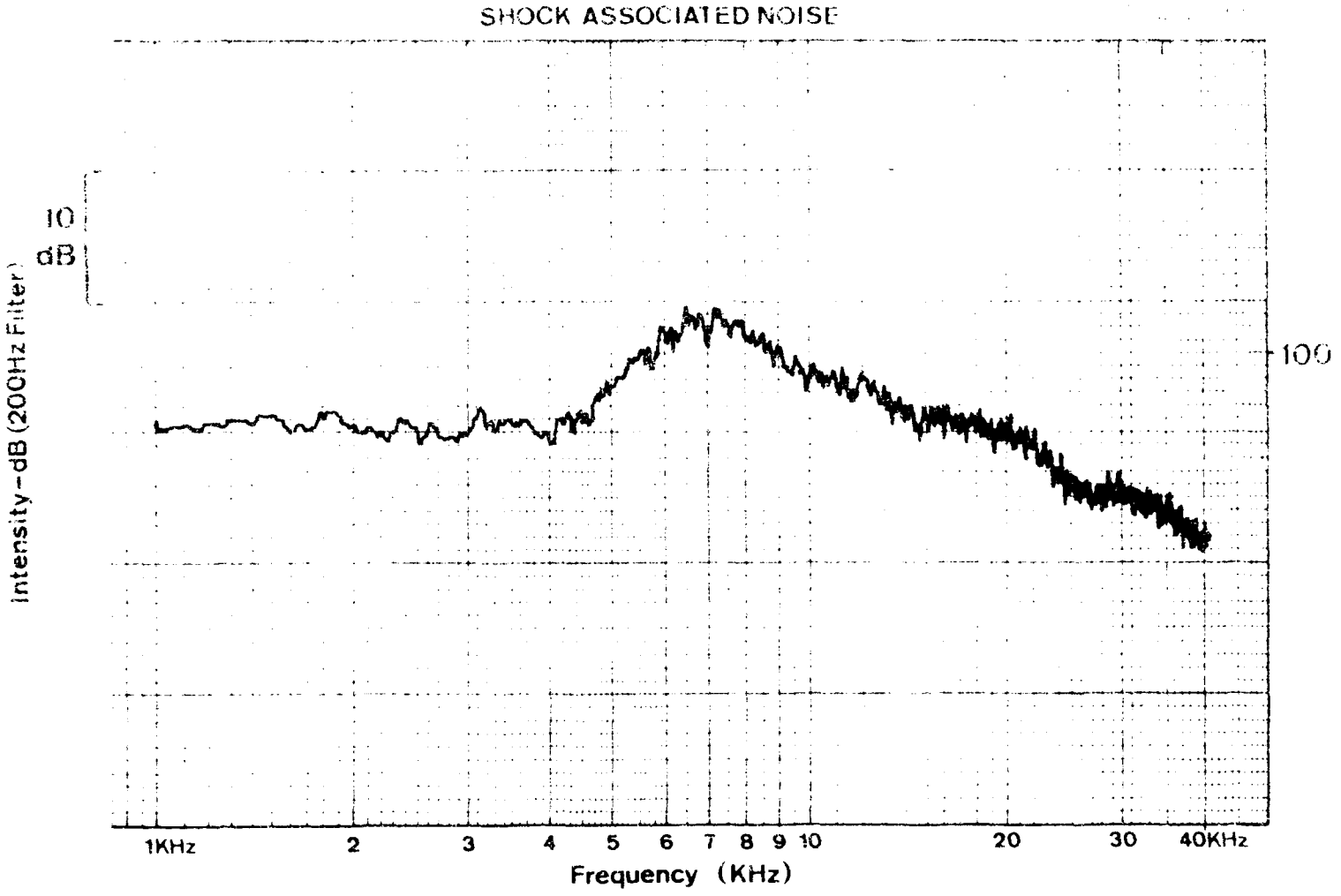
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
10
dB
Intensity-dB (200Hz Filter)
100
1KHz
2
3
4
5
6
7
8
9
10
20
30
40KHz
Frequency (KHz)


SHOCK ASSOCIATED NOISE
10
dB
Intensity-dB (200Hz Filter)
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1KHz
2
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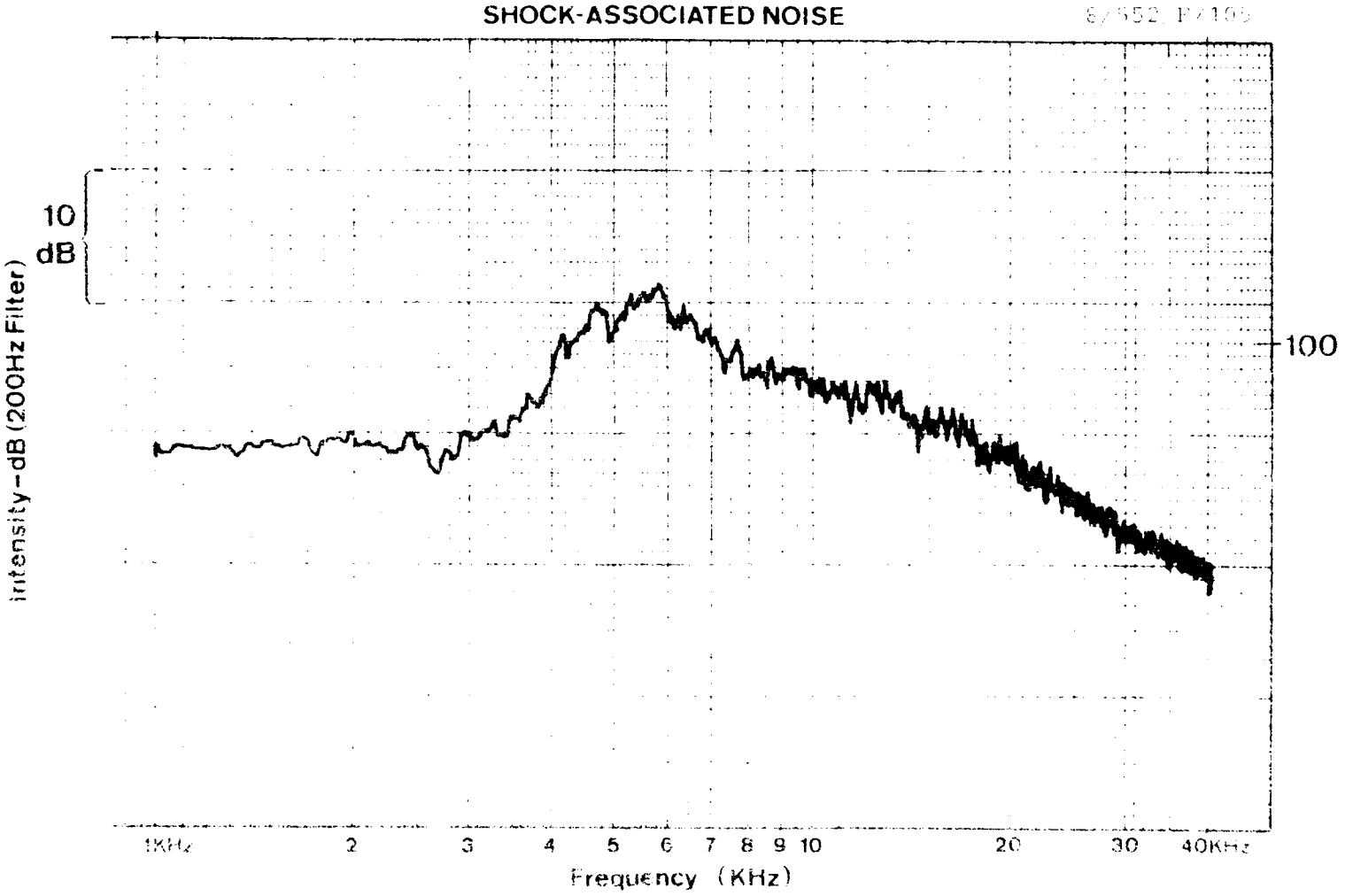
5
6
7
8
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
10
dB
Intensity - dB (200Hz Filter)
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1KHz
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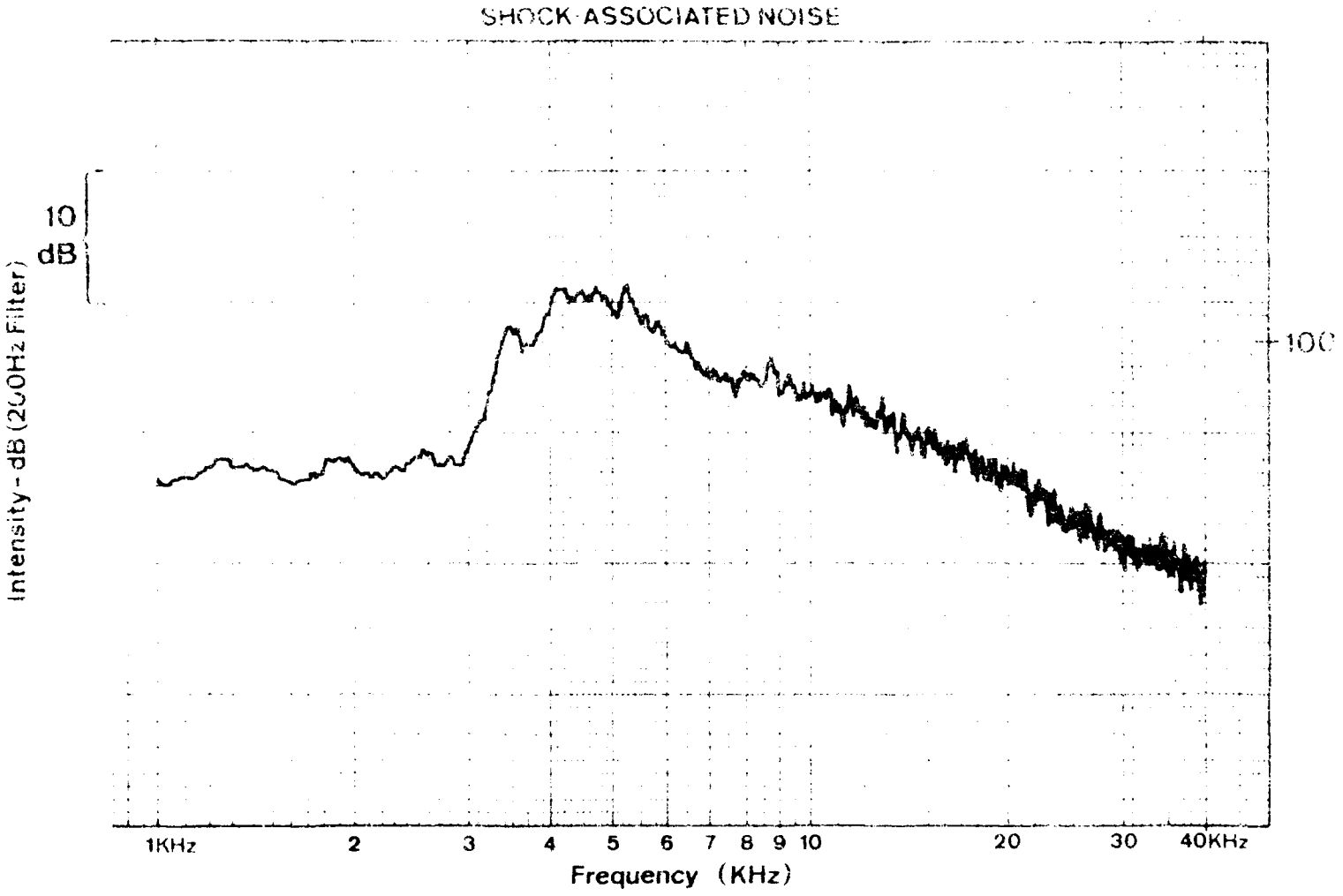
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
10
dB
Intensity - dB (200Hz Filter)
100
1KHz
2
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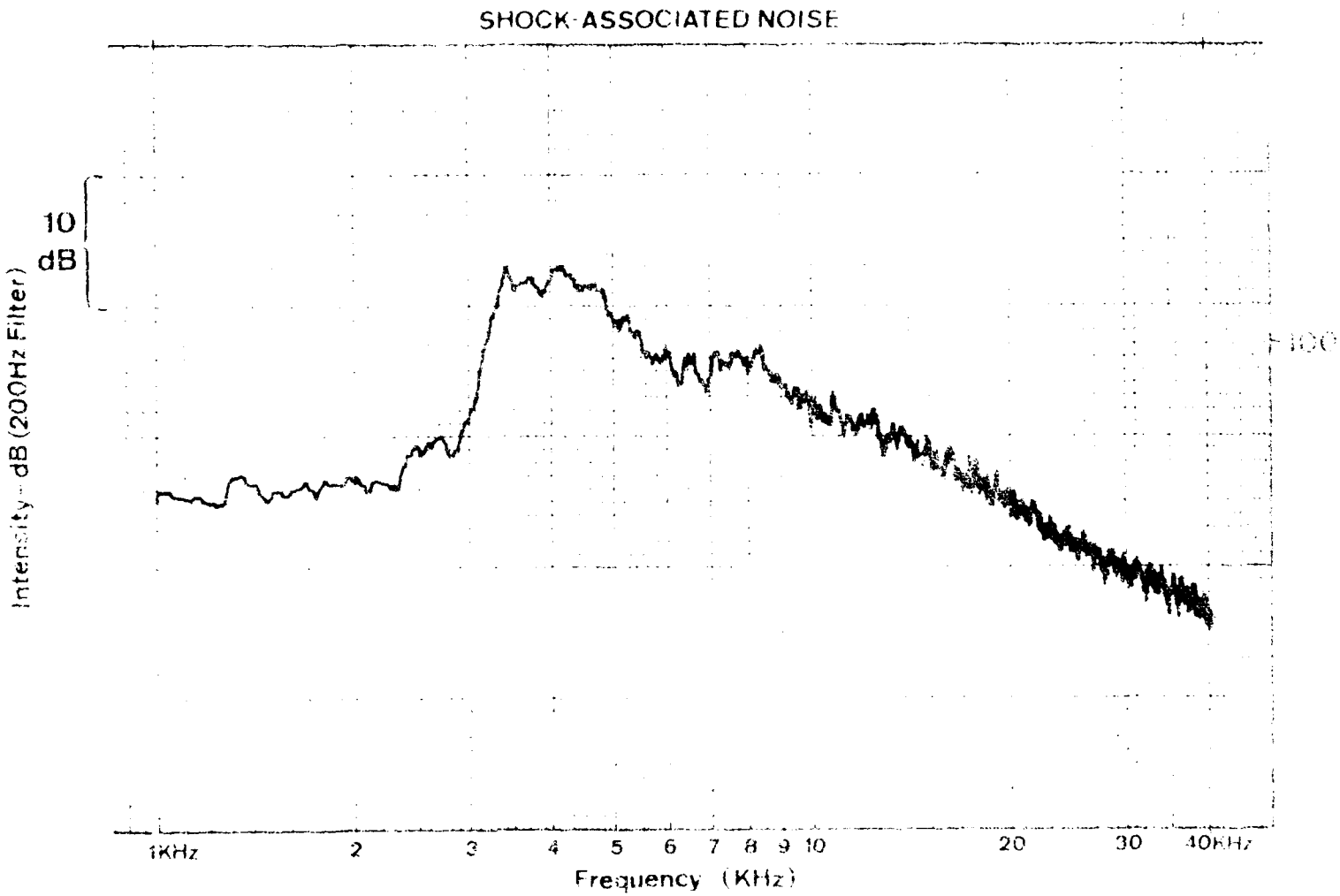
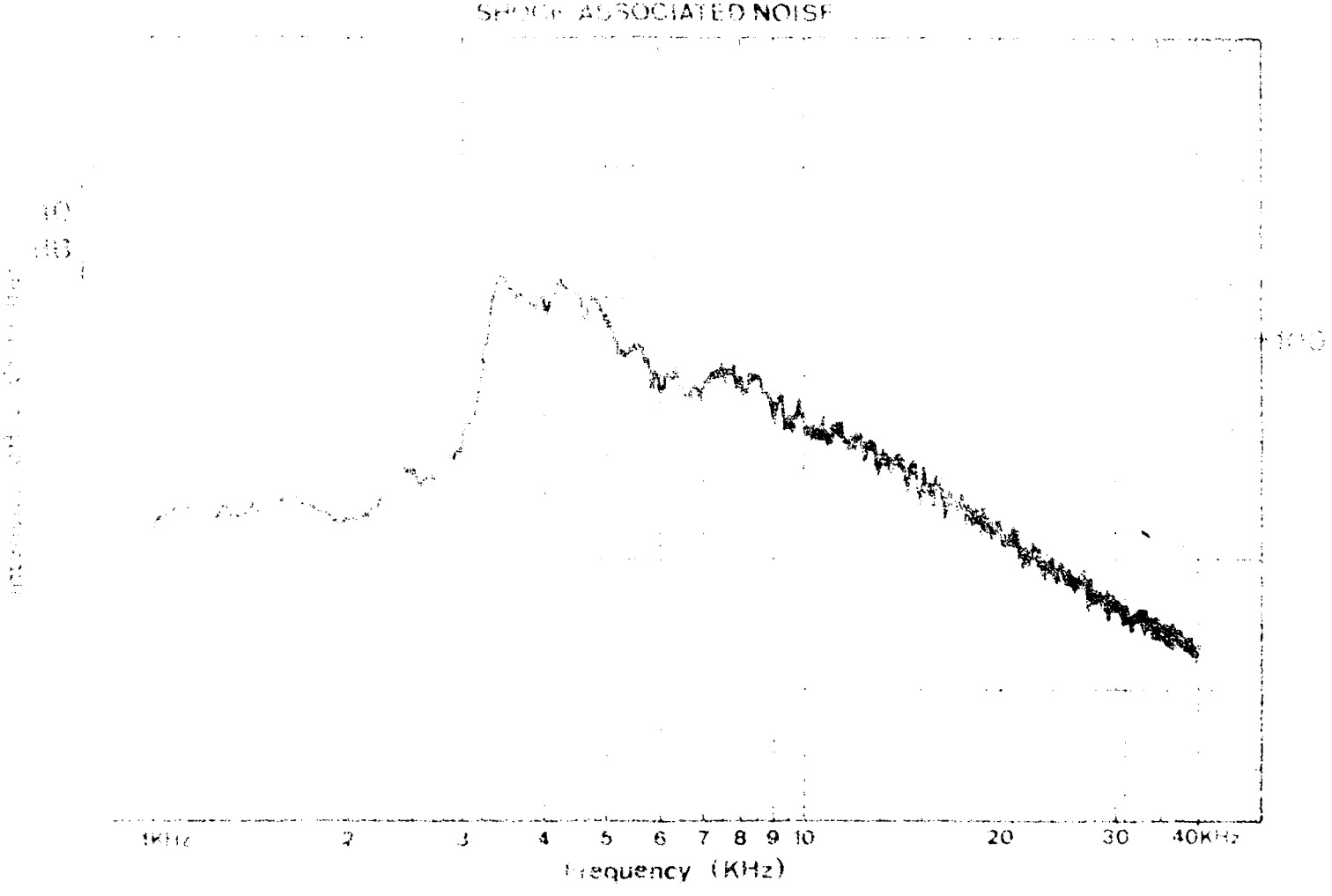
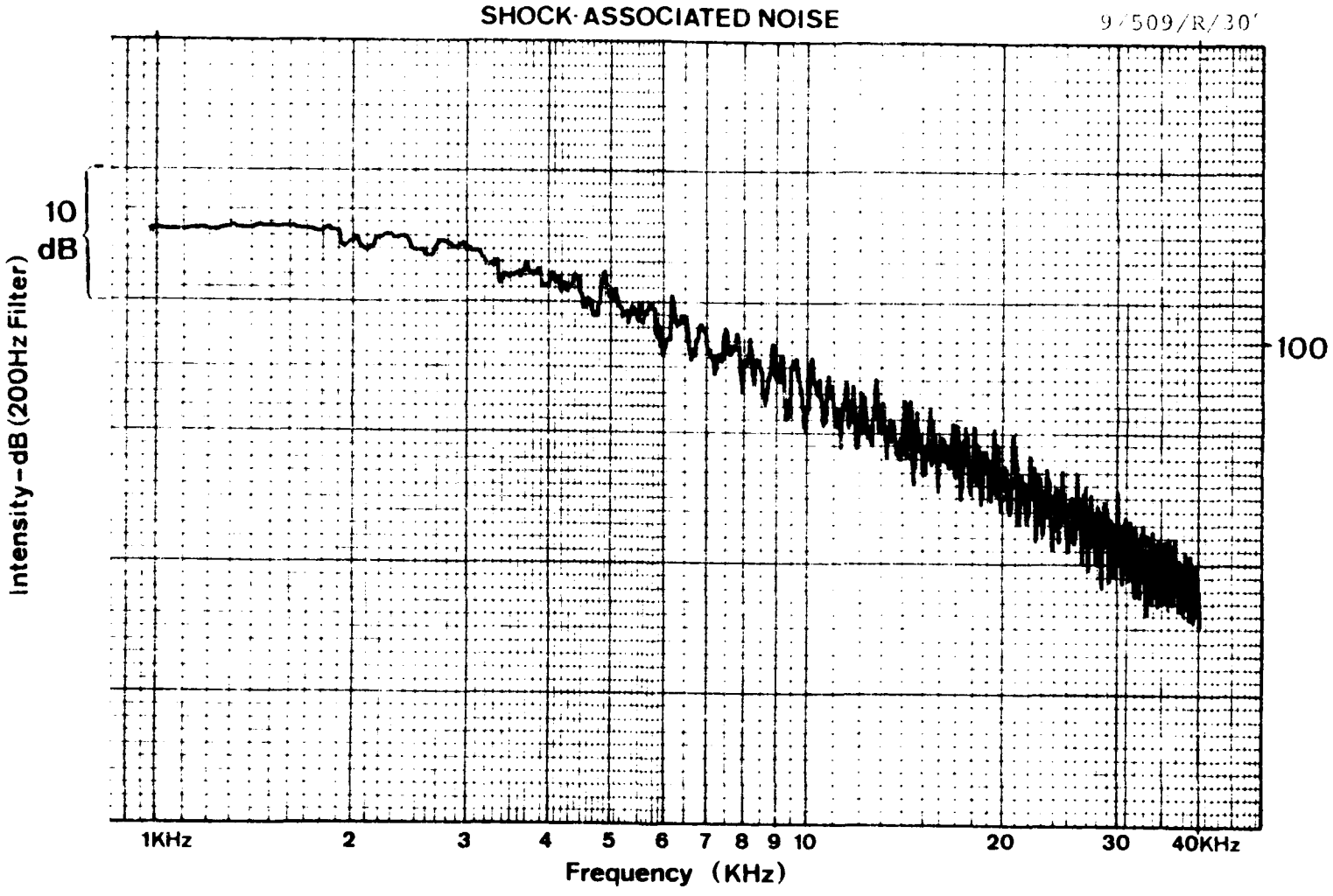
4
5
6
7
8
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
10
dB
Intensity - dB (200Hz Filter)
1KHz
2
3
4
5
6
7
8
9
10
20
30
40KHz
Frequency (KHz)


SHOCK ASSOCIATED NOISE
1KHz
2
3
4
5
6
7
8
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
9/509/R/30'
10
dB
Intensity-dB (200Hz Filter)
100
1KHz
2
3
4
5
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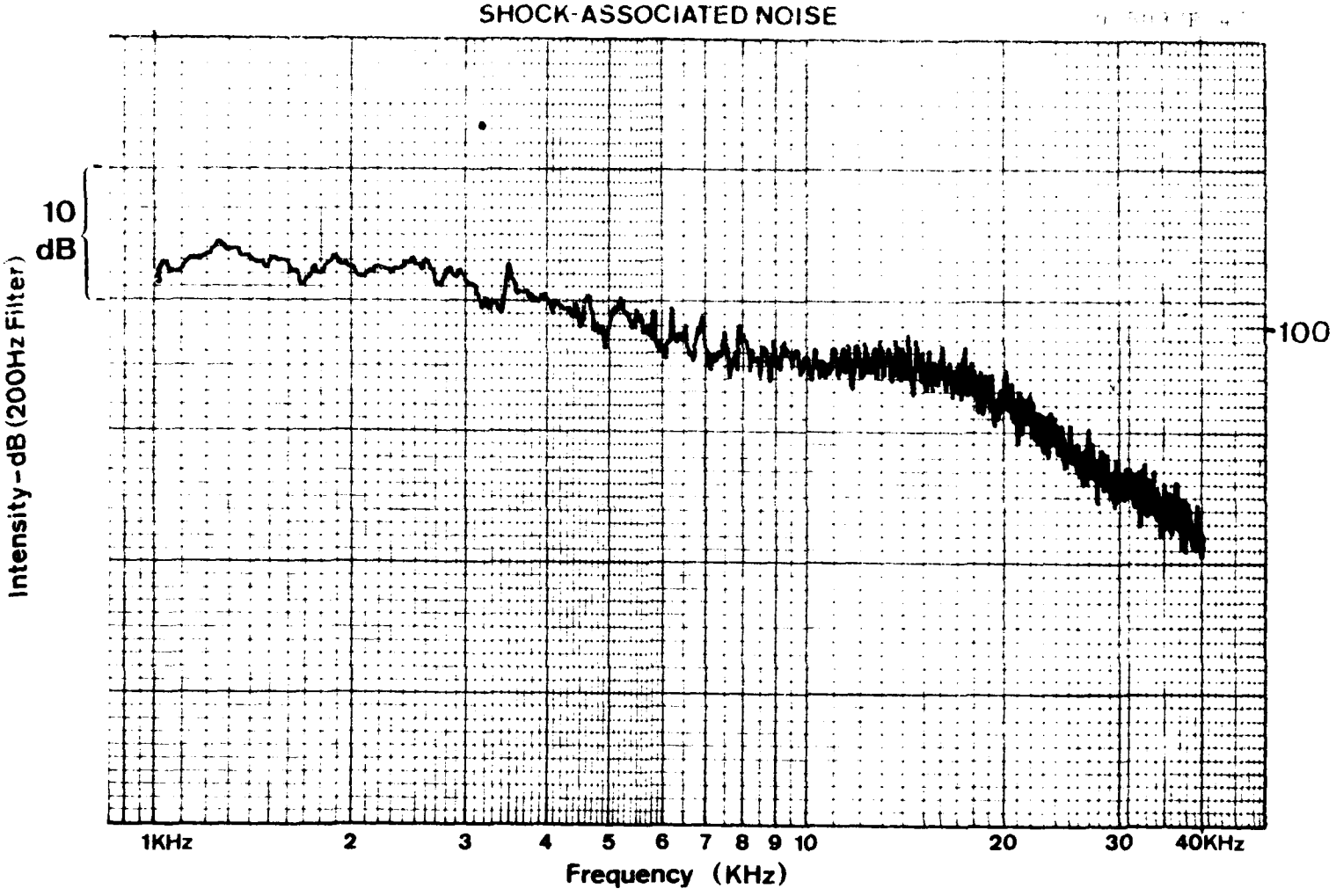
7
8
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
10
dB
Intensity - dB (200Hz Filter)
100
1KHz
2
3
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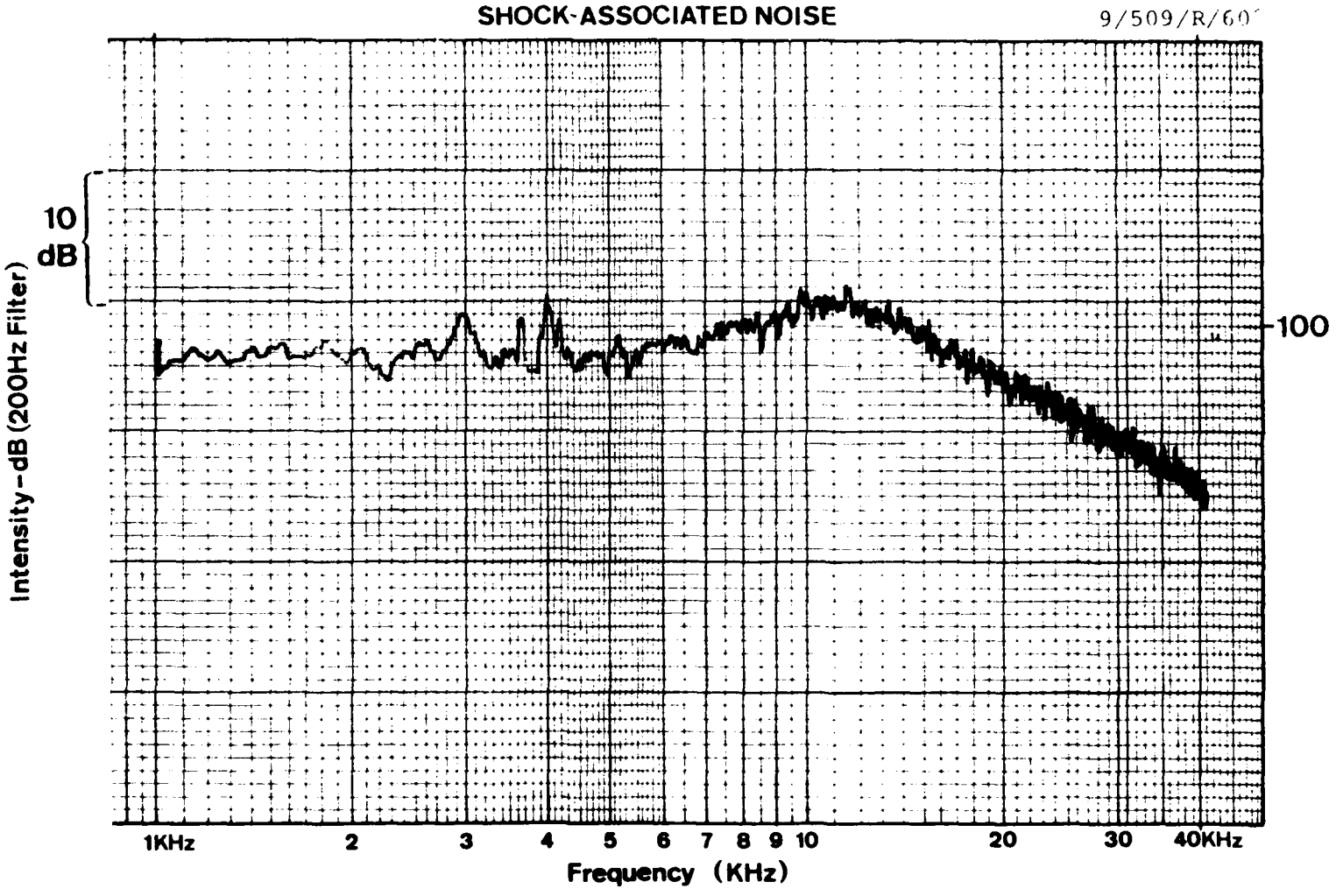
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
9/509/R/60
10
dB
Intensity-dB (200Hz Filter)
100
1KHz
2
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9
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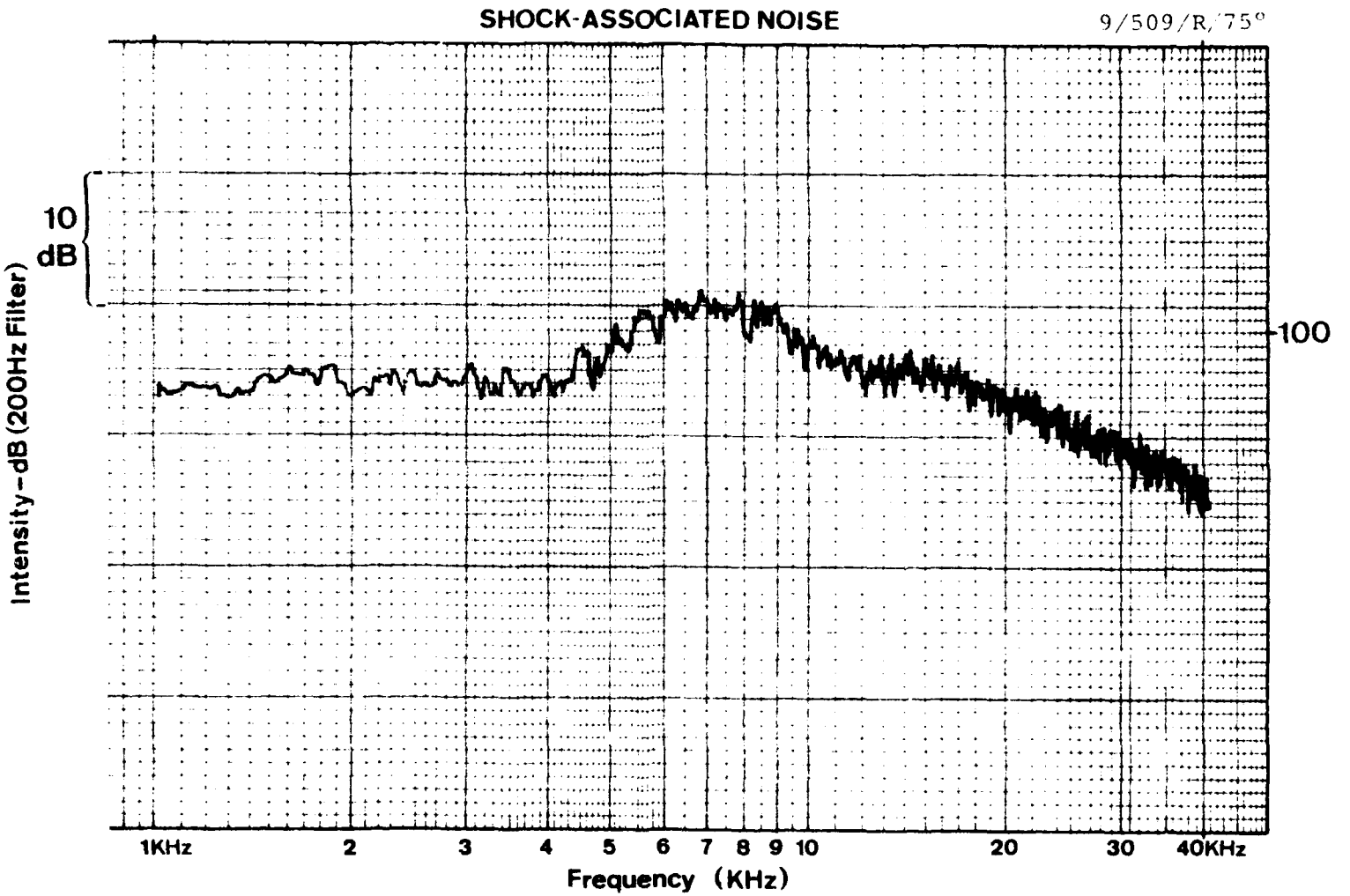
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
9/509/R/75°
10
dB
Intensity-dB (200Hz Filter)
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1KHz
2
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9
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20
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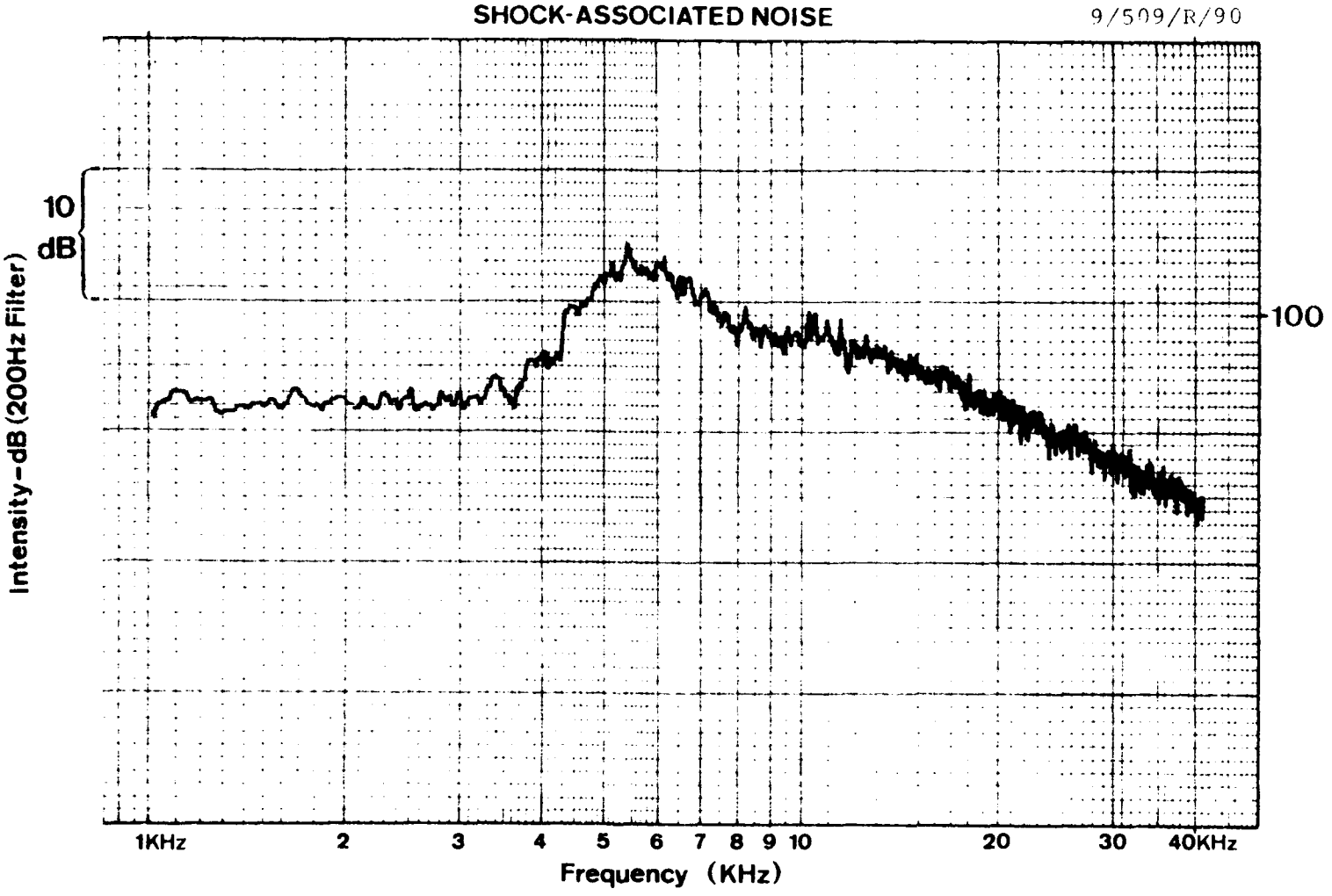
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
9/509/R/90
10
dB
Intensity-dB (200Hz Filter)
100
1KHz
2
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9
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20
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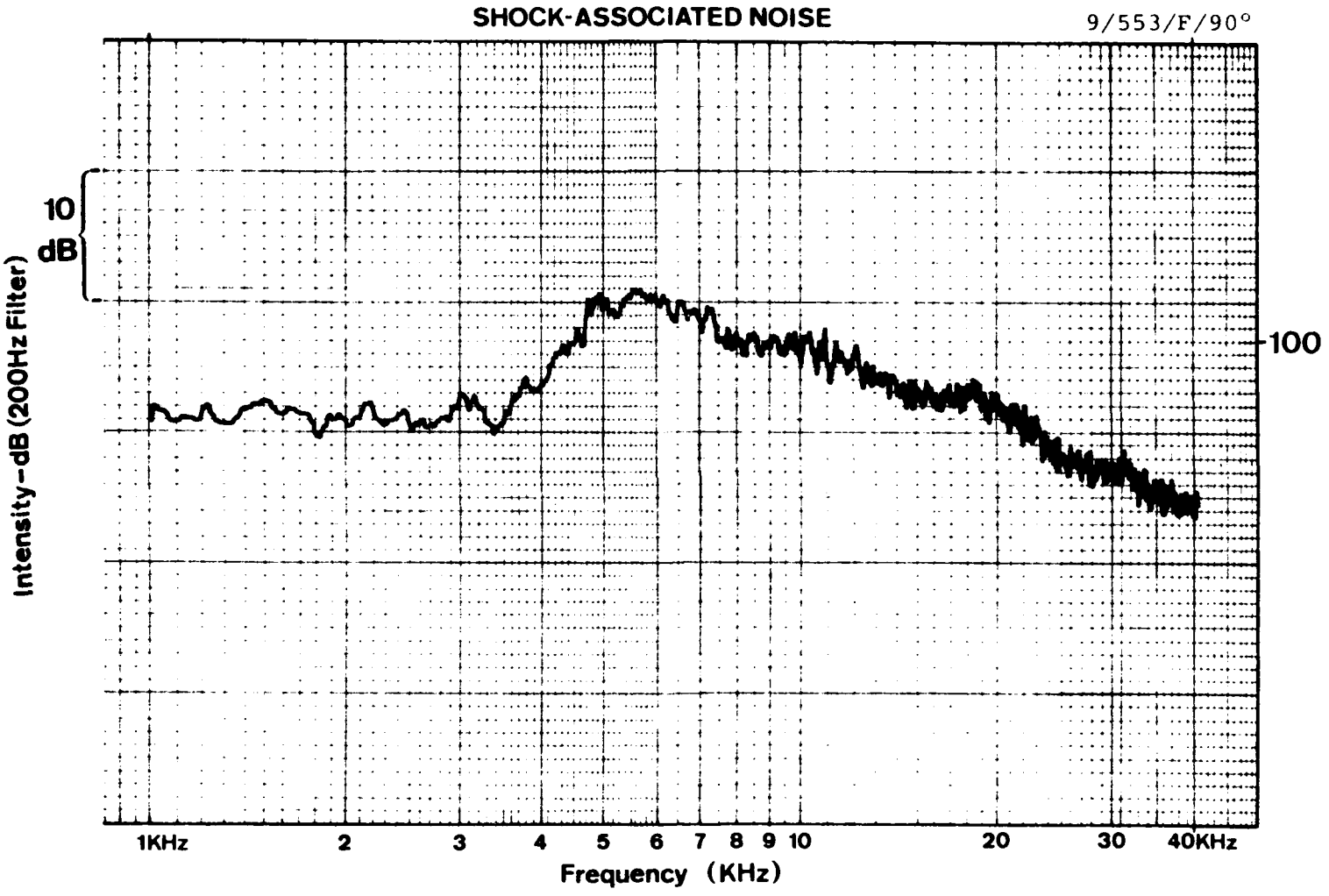
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
9/553/F/90°
10
dB
Intensity-dB (200Hz Filter)
100
1KHz
2
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4
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9
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20
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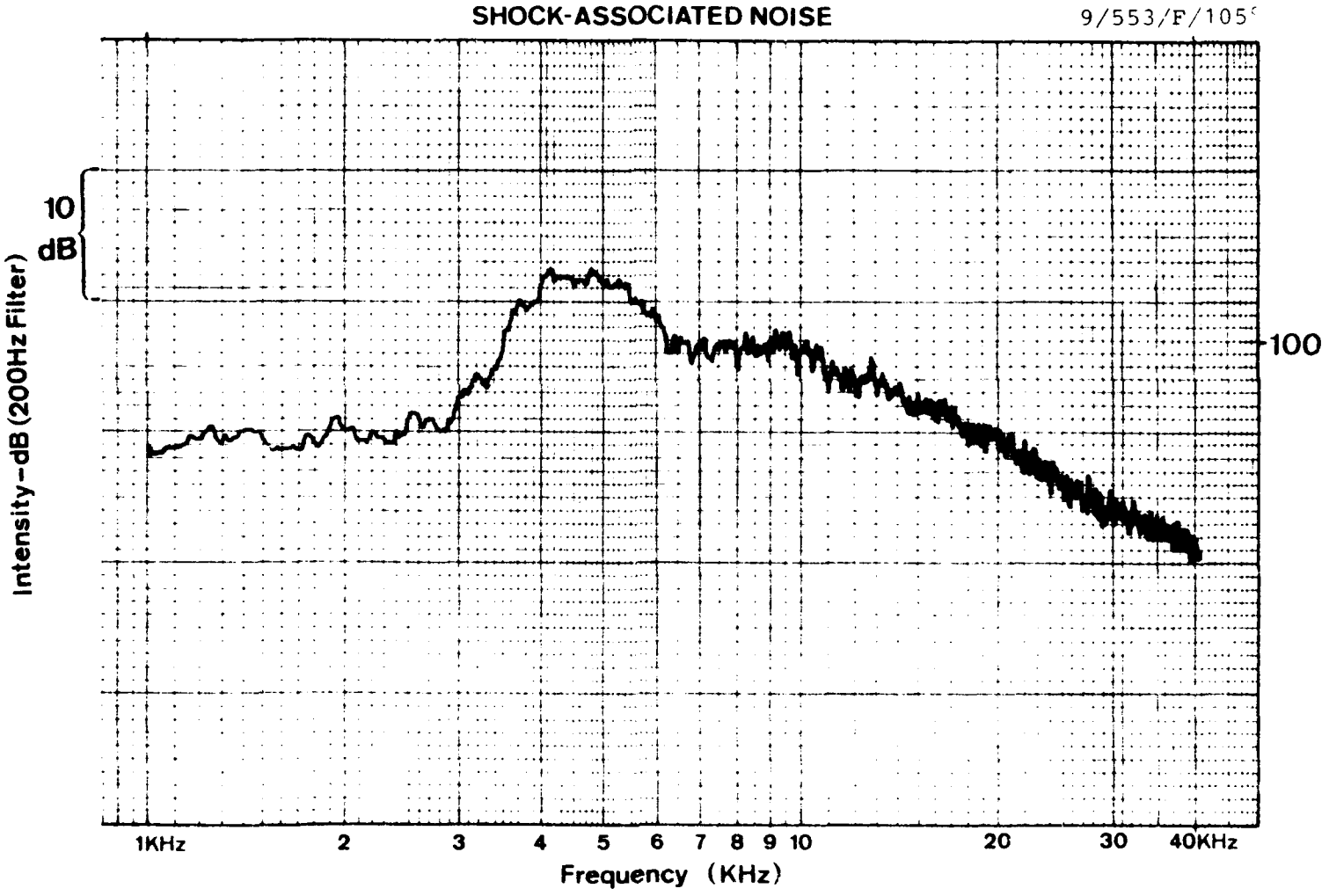
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
9/553/F/105
10
dB
Intensity--dB (200Hz Filter)
100
1KHz
2
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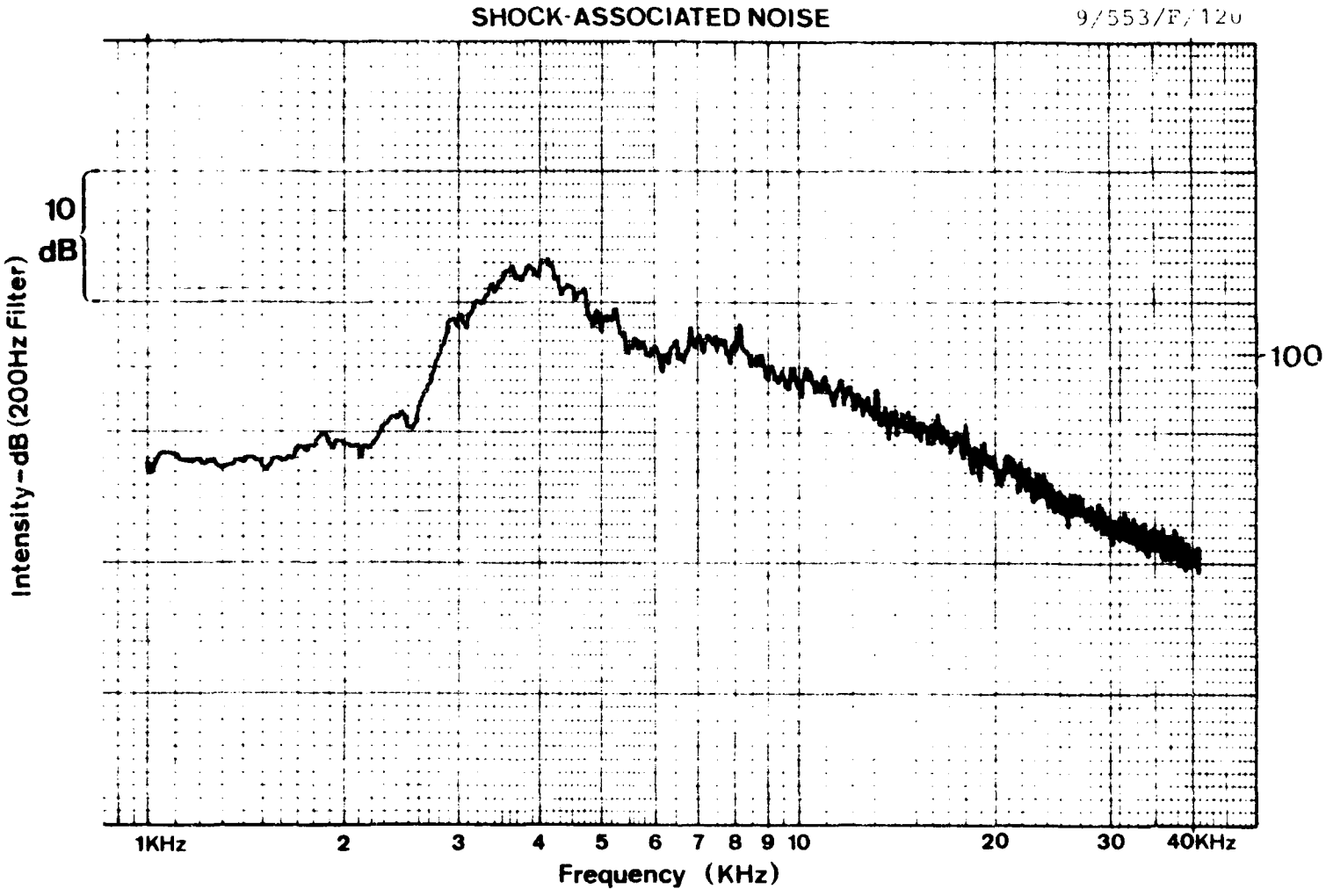
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
9/553/F/120
10
dB
Intensity-dB (200Hz Filter)
100
1KHz
2
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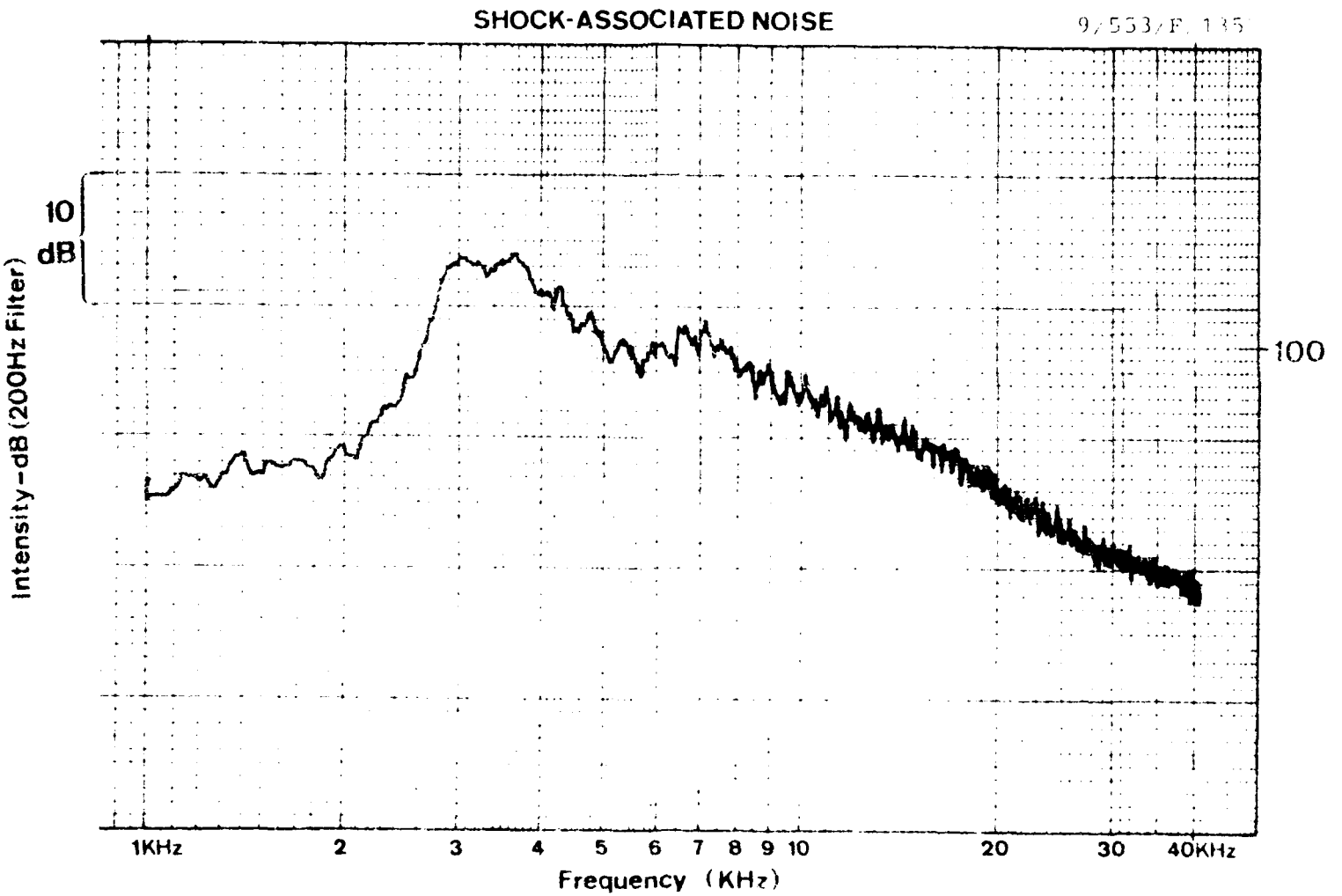
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
9/553/F 135
10
dB
Intensity - dB (200Hz Filter)
100
1KHz
2
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9
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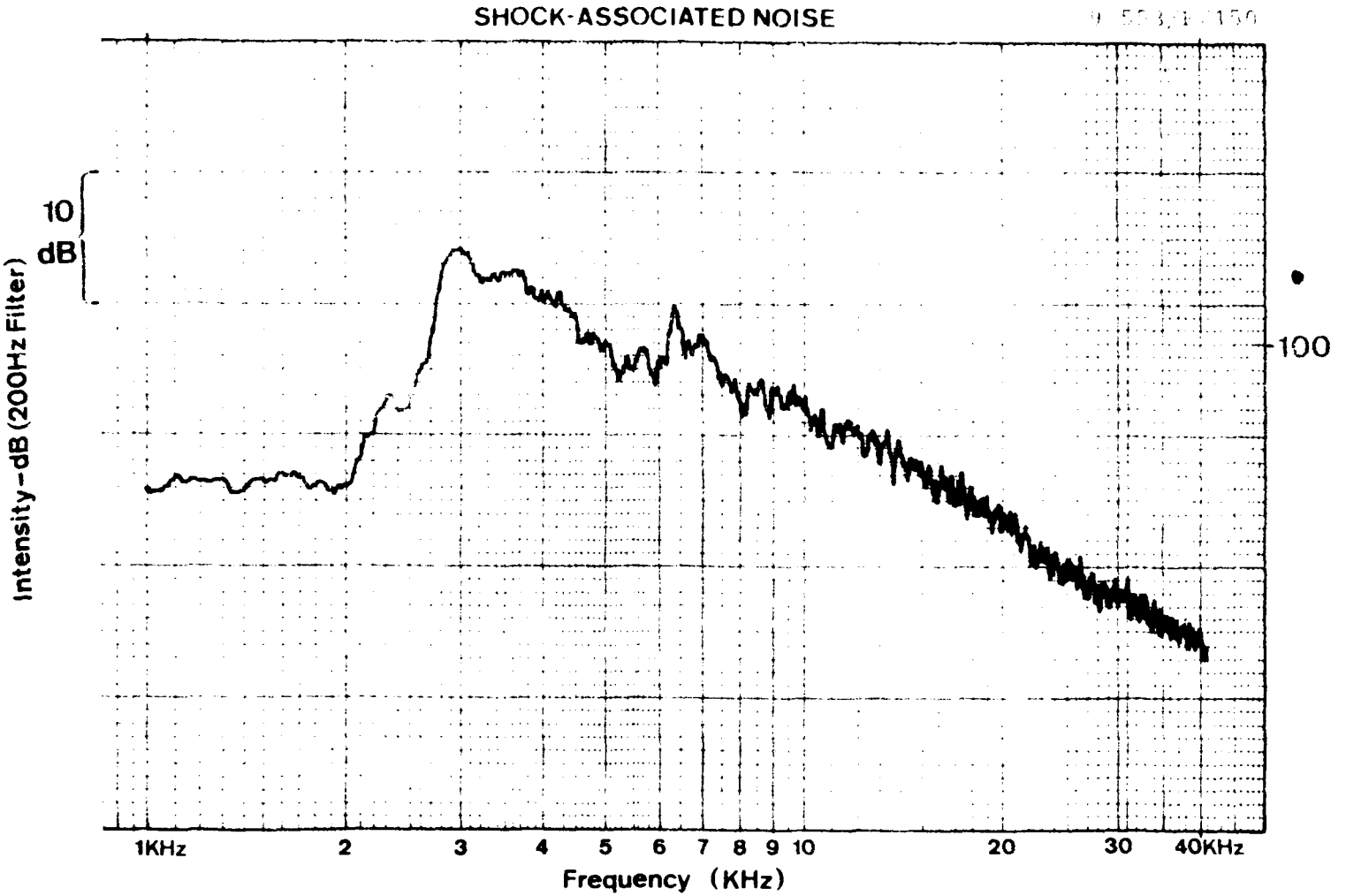
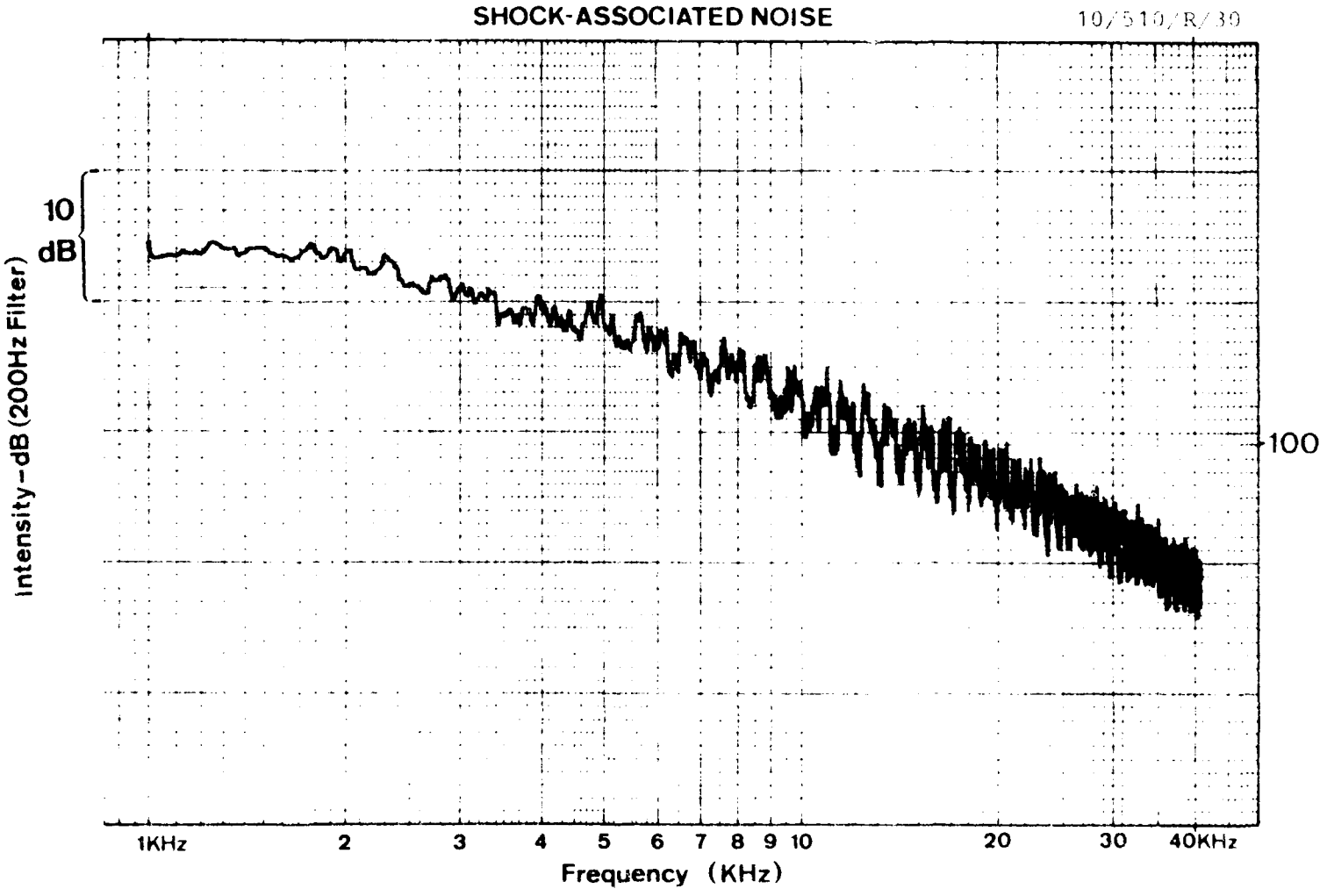
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
10
dB
Intensity-dB (200Hz Filter)
100
1KHz
2
3
4
5
6
7
8
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
10/510/R/30
10
dB
Intensity-dB (200Hz Filter)
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1KHz
2
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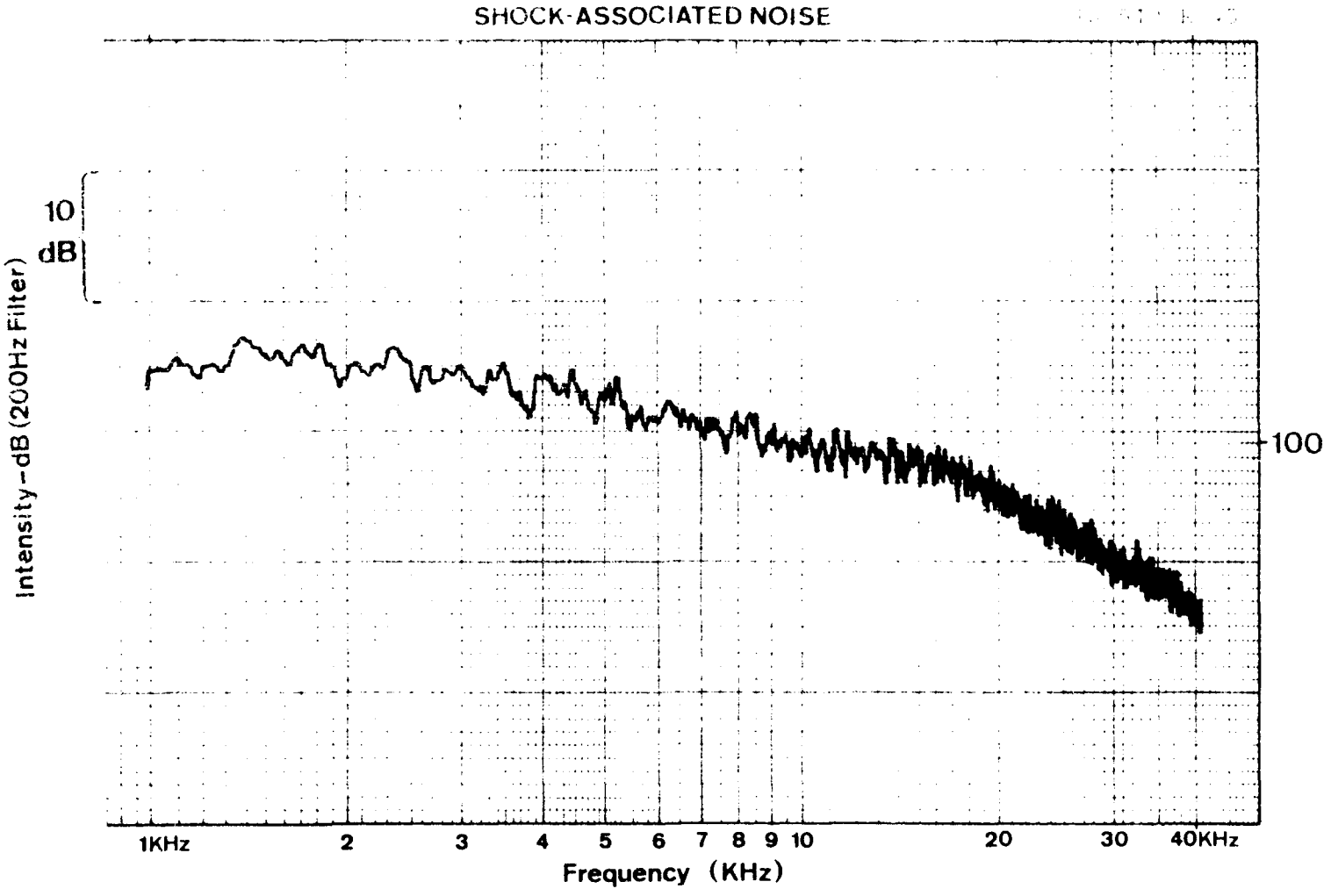
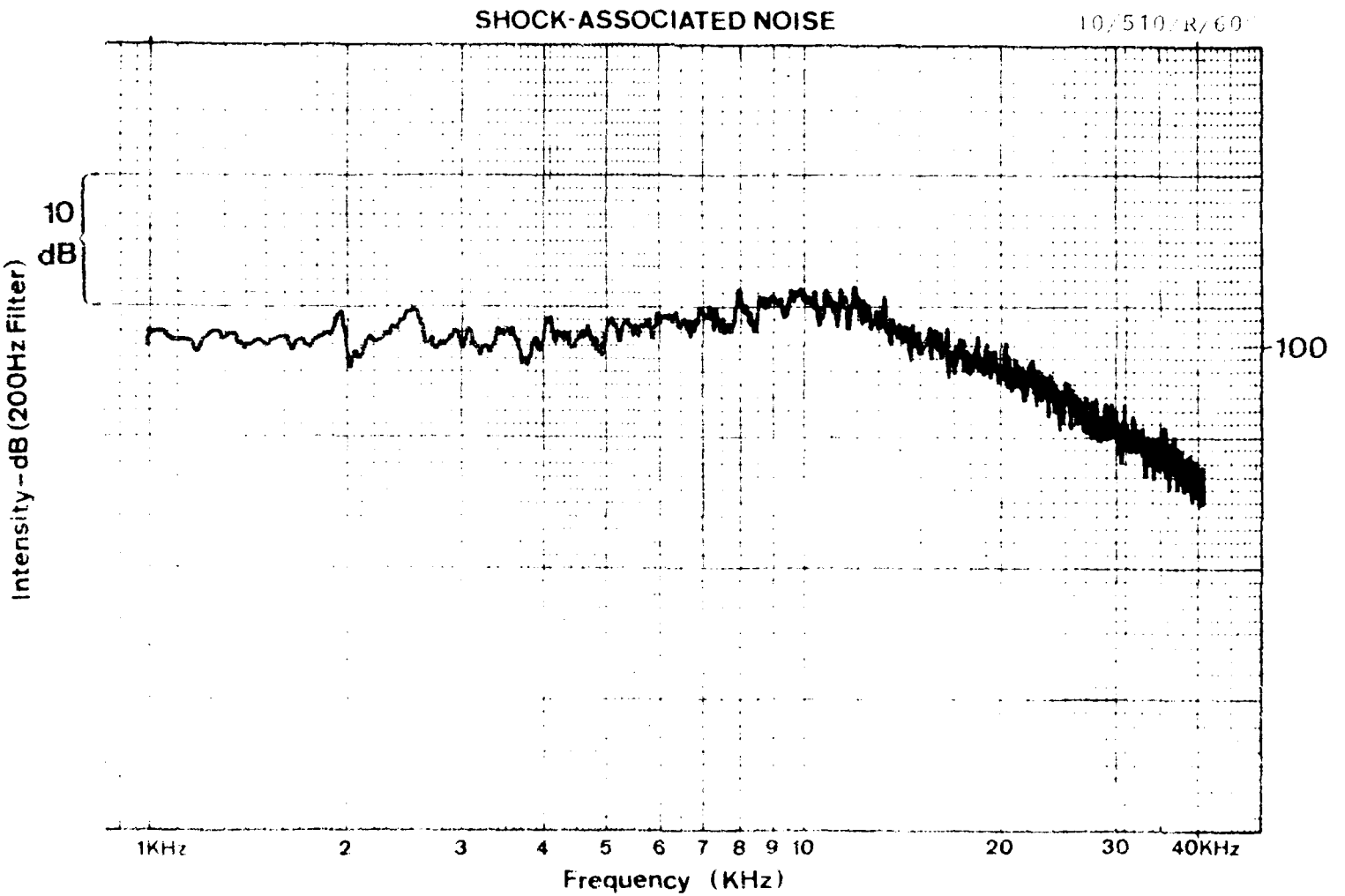
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
10
dB
Intensity-dB (200Hz Filter)
100
1KHz
2
3
4
5
6
7
8
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
10/510/R/60
10
dB
Intensity-dB (200Hz Filter)
100
1KHz
2
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4
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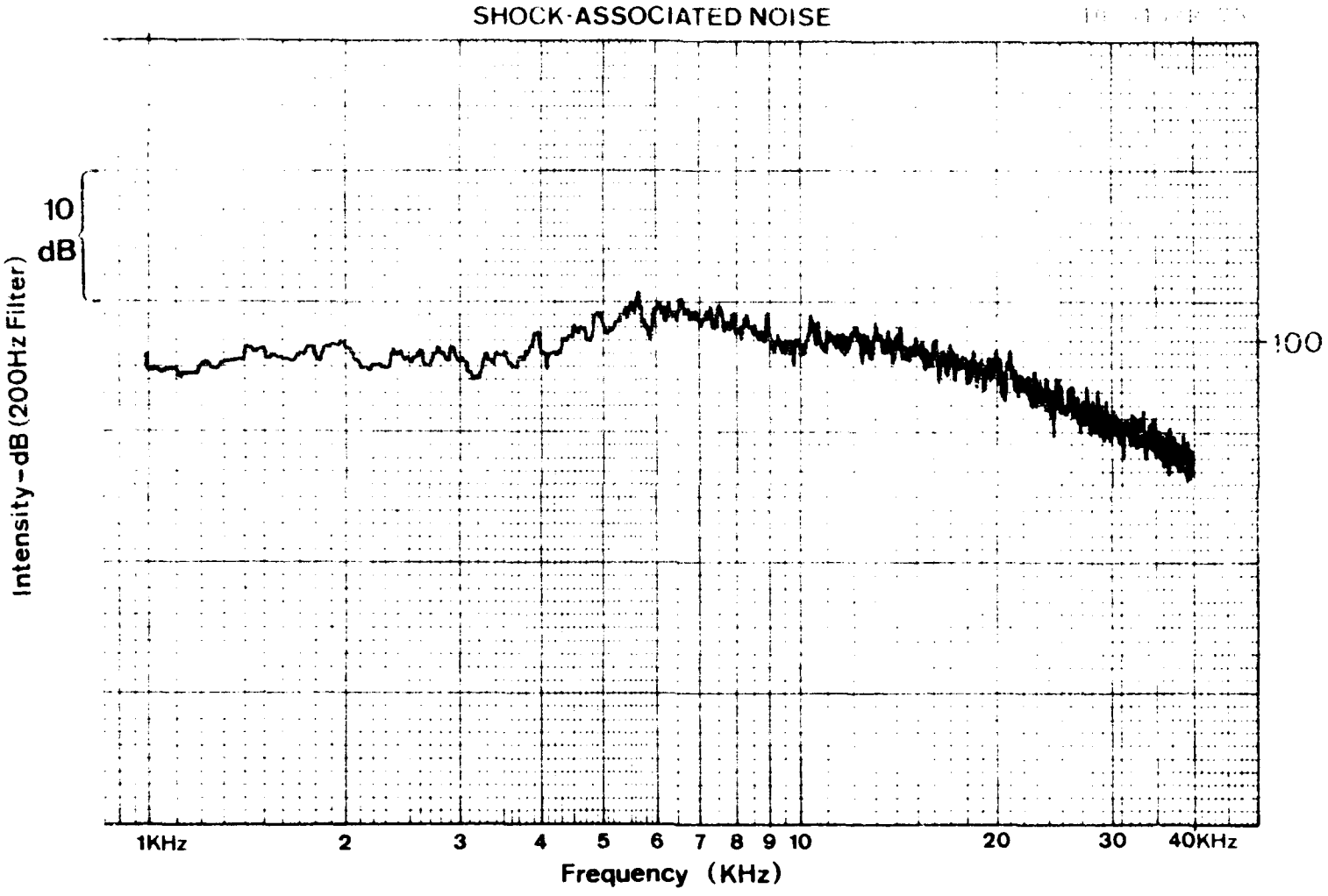
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
10
dB
Intensity - dB (200Hz Filter)
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1KHz
2
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9
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20
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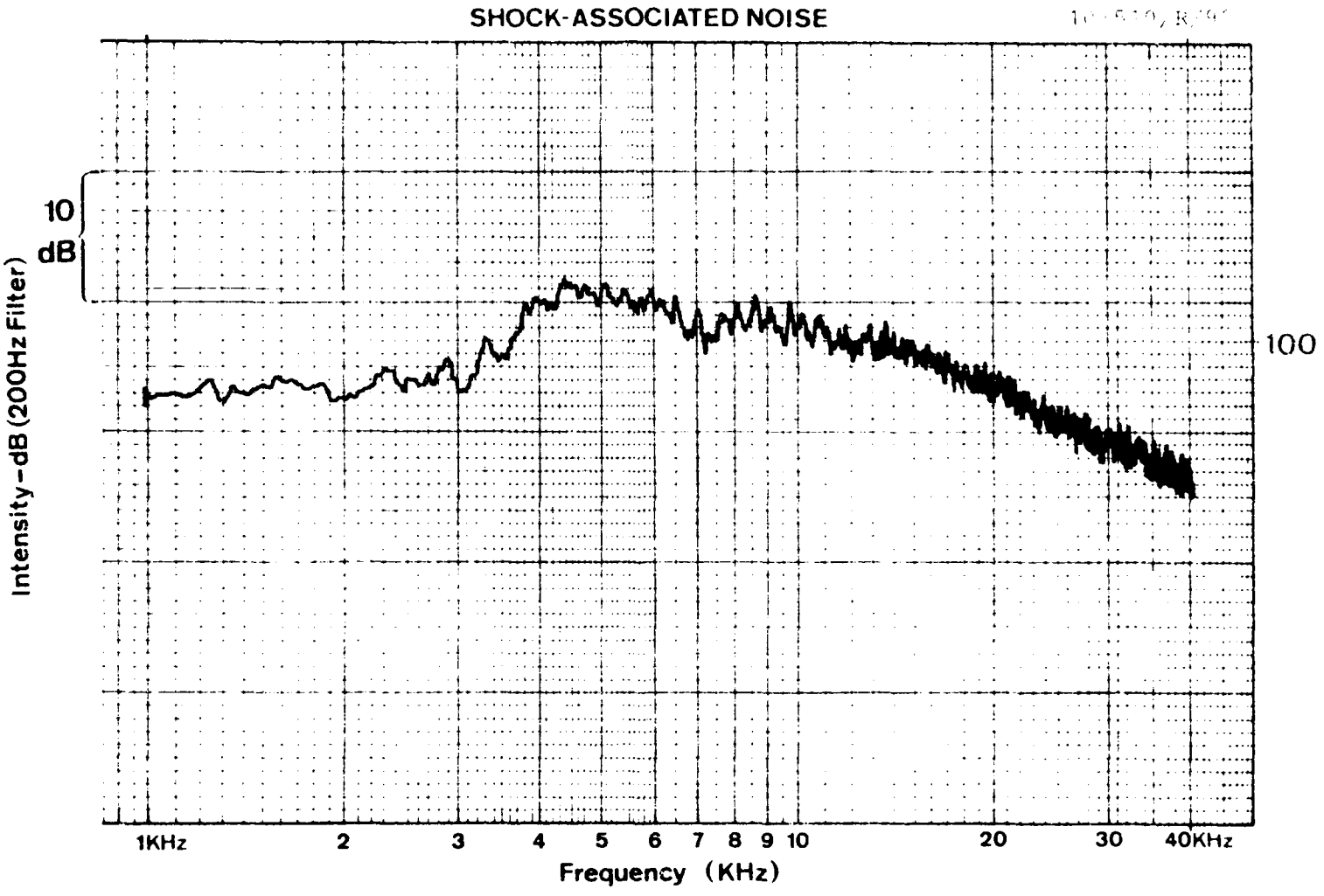
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
10
dB
Intensity-dB (200Hz Filter)
100
1KHz
2
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9
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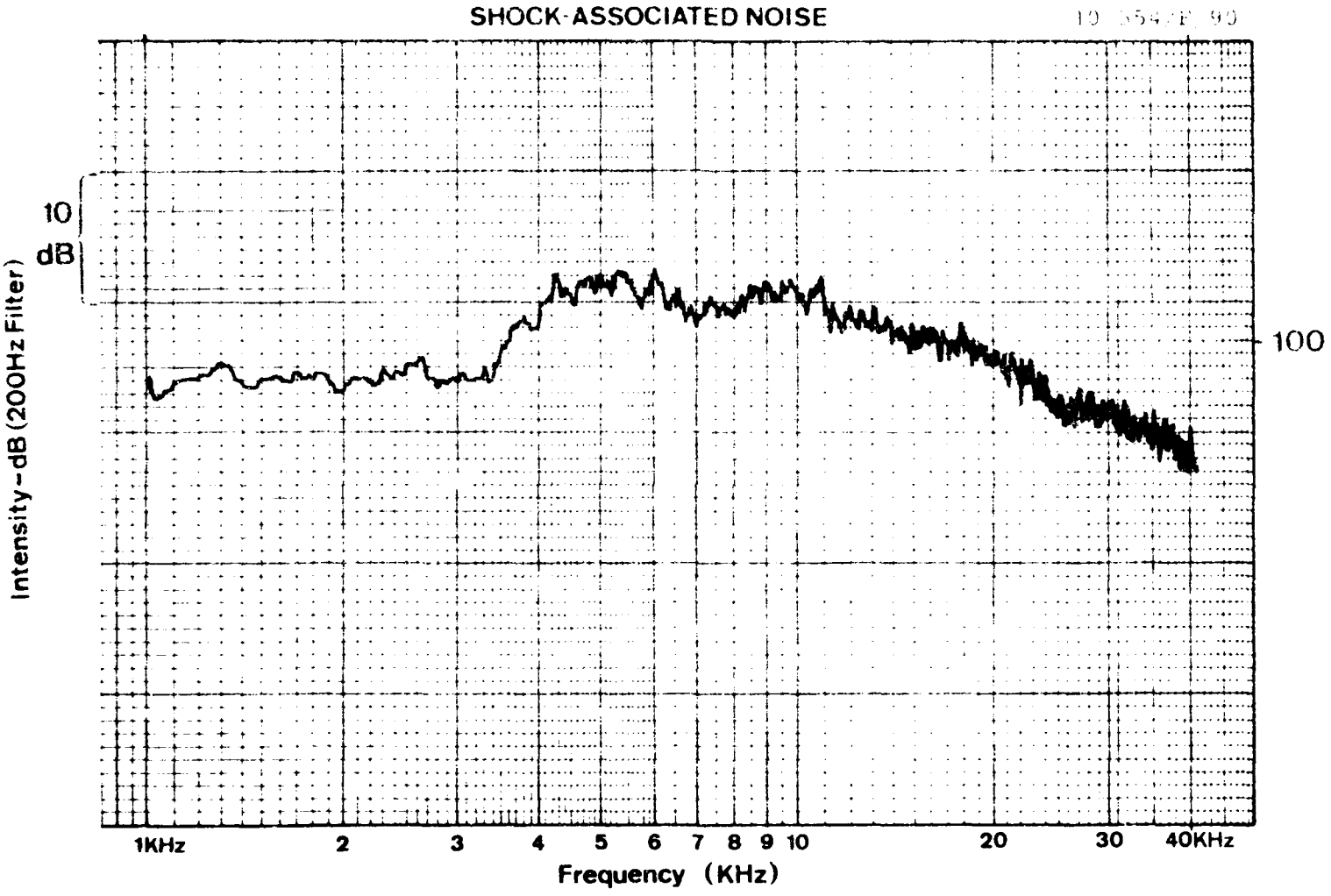
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
10
dB
Intensity-dB (200Hz Filter)
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1KHz
2
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9
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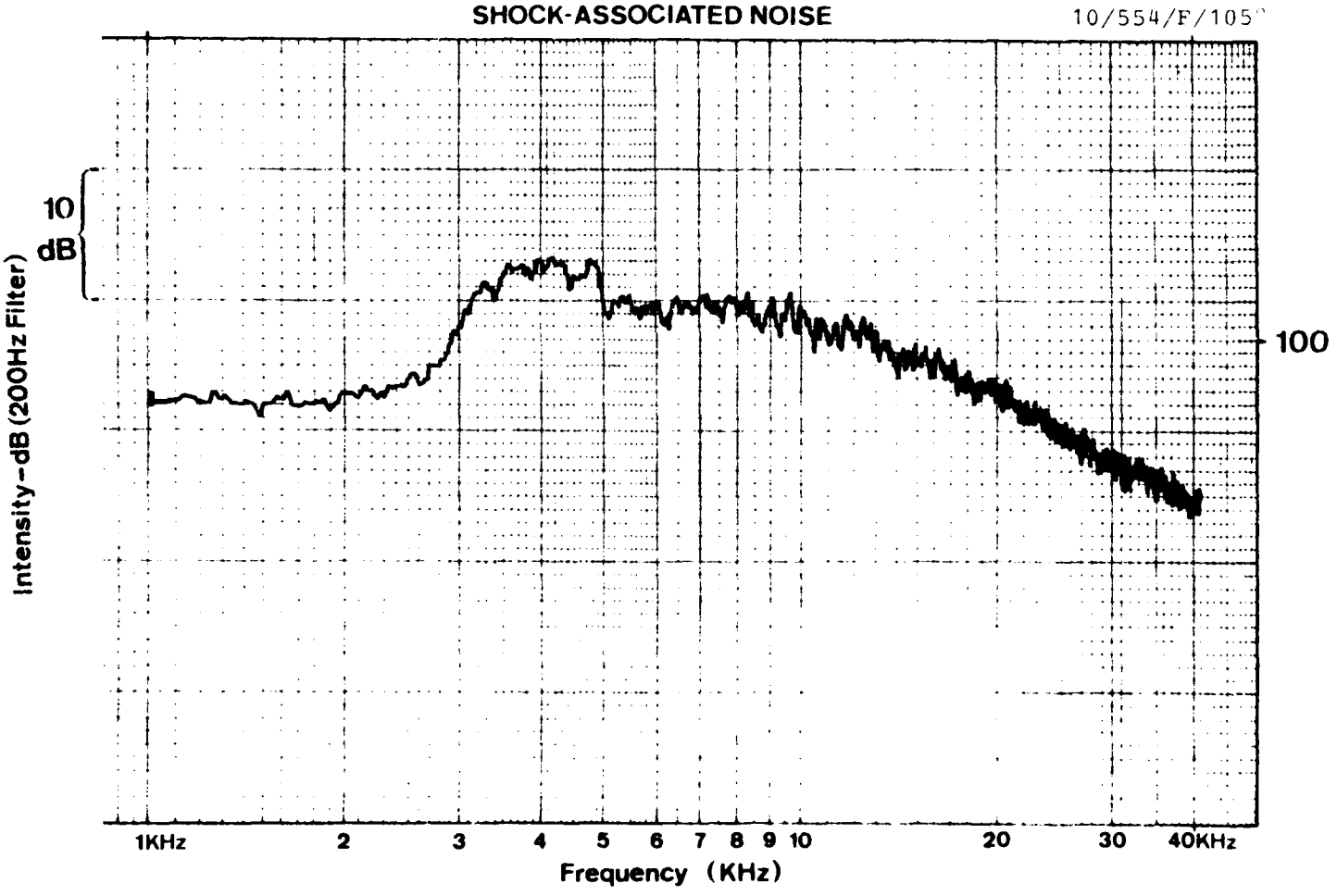
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
10/554/F/105
10
dB
Intensity-dB (200Hz Filter)
100
1KHz
2
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4
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6
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9
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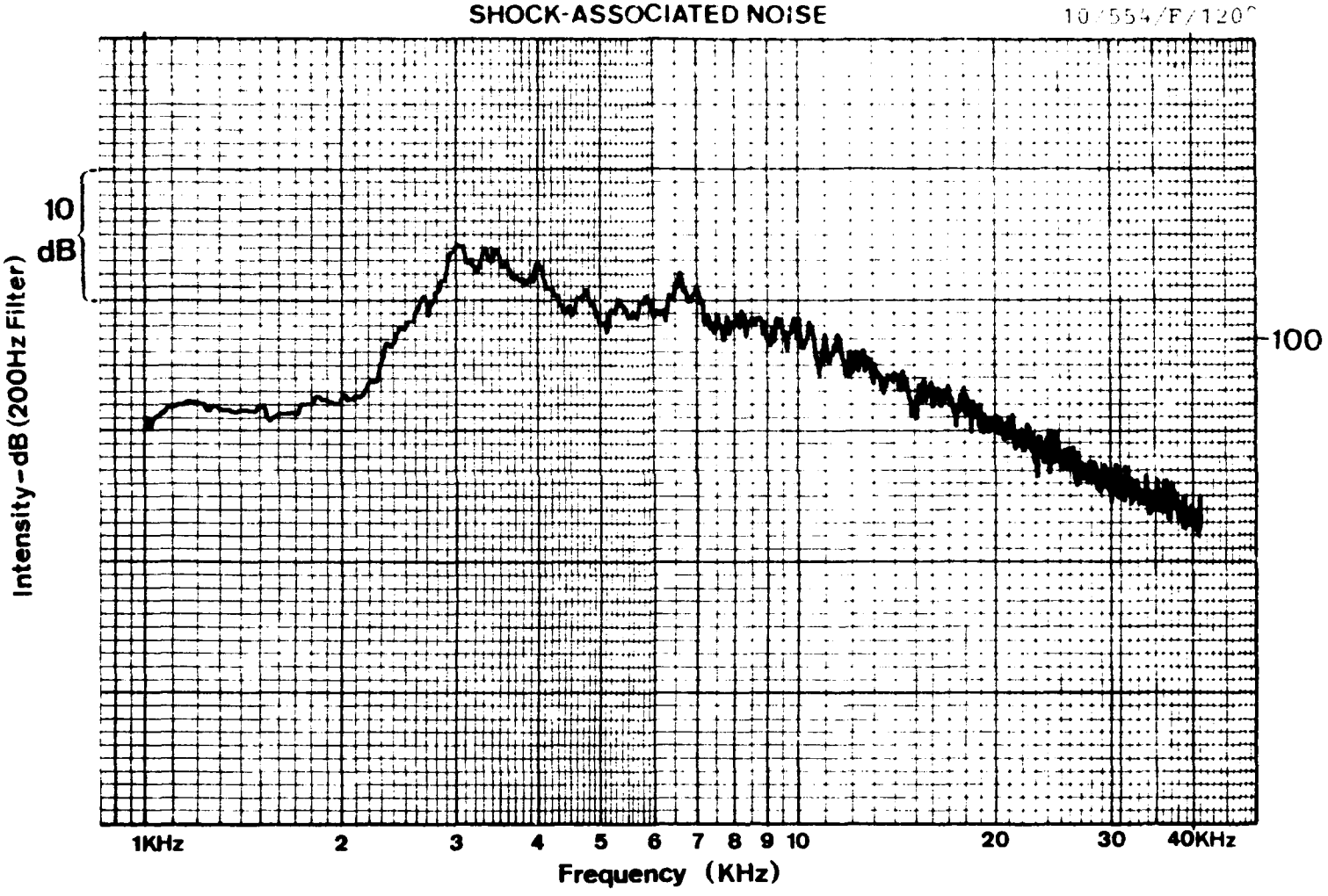
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
10/554/F/120
10
dB
Intensity-dB (200Hz Filter)
100
1KHz
2
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4
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6
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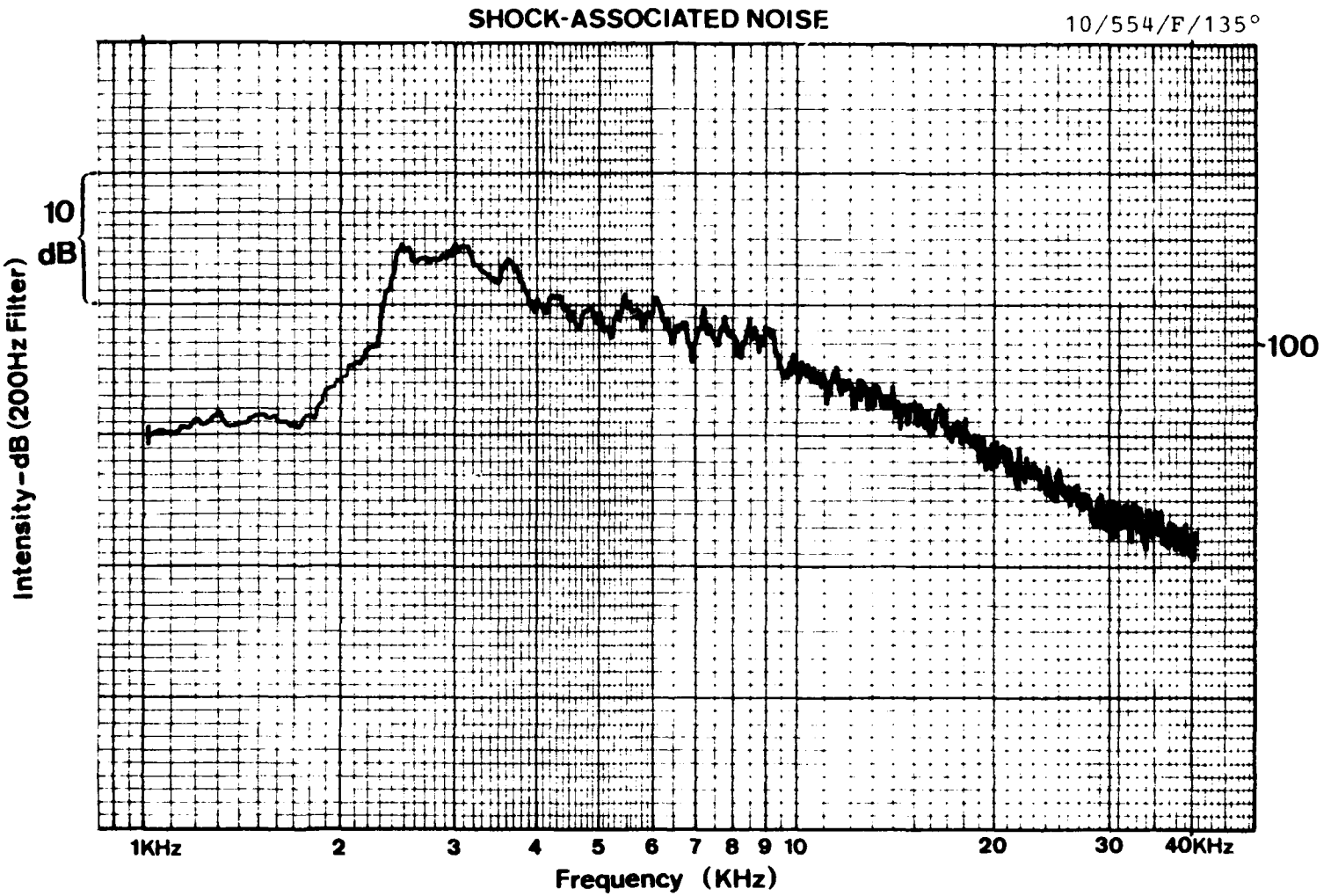
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
10/554/F/135°
10
dB
Intensity - dB (200Hz Filter)
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1KHz
2
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9
10
20
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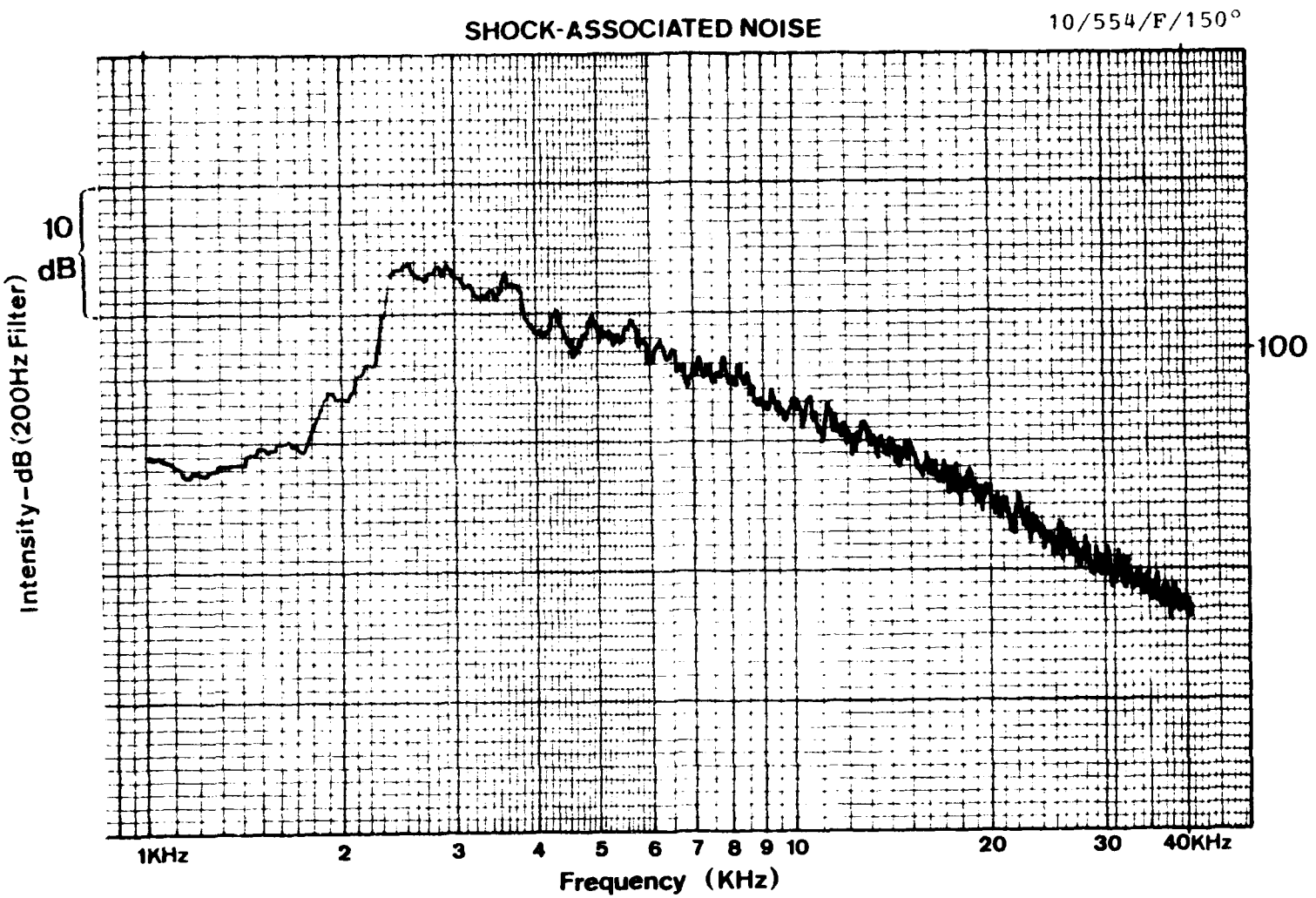
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
10/554/F/150°
10
dB
Intensity-dB (200Hz Filter)
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1KHz
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9
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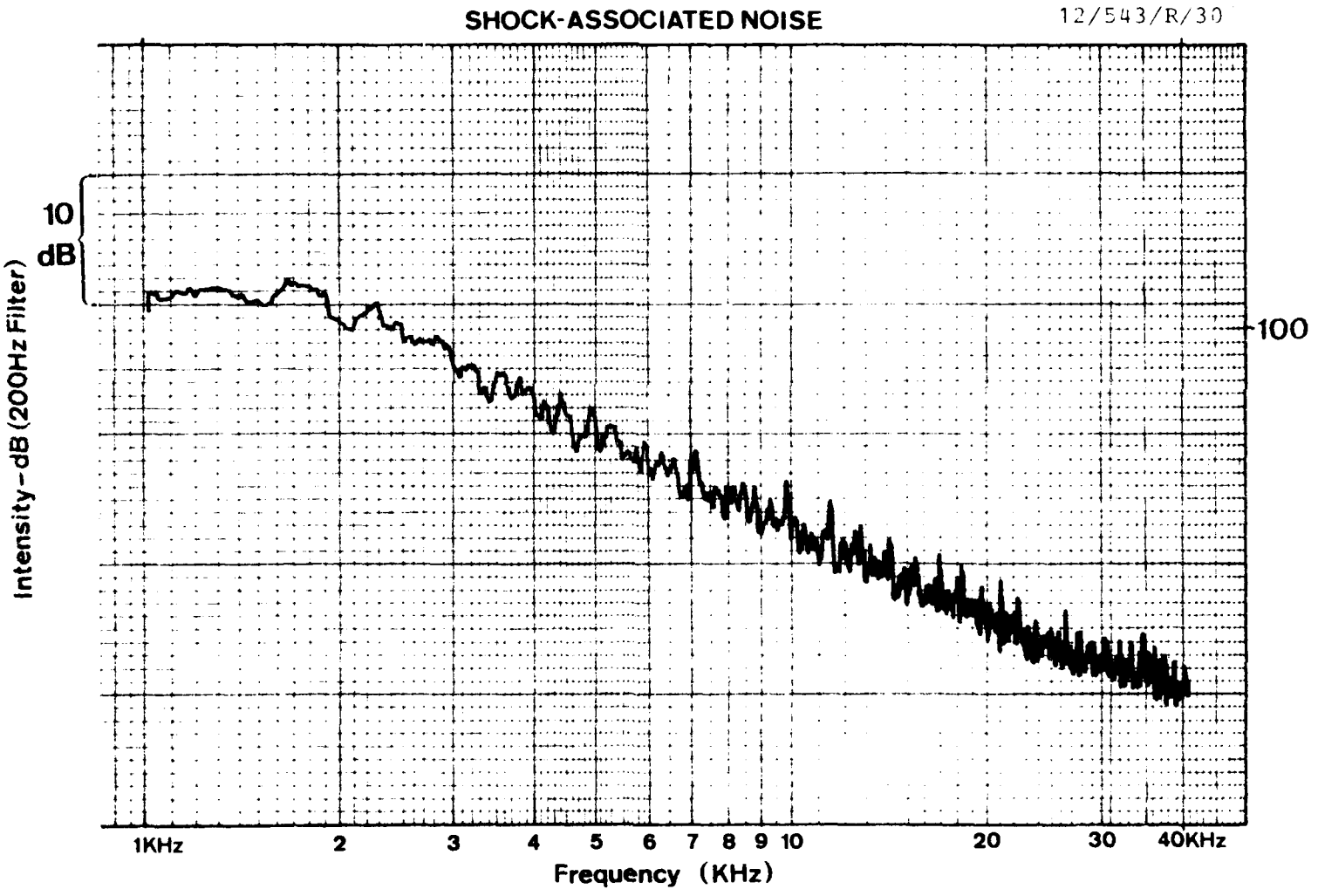
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
12/543/R/30
10
dB
Intensity - dB (200Hz Filter)
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1KHz
2
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4
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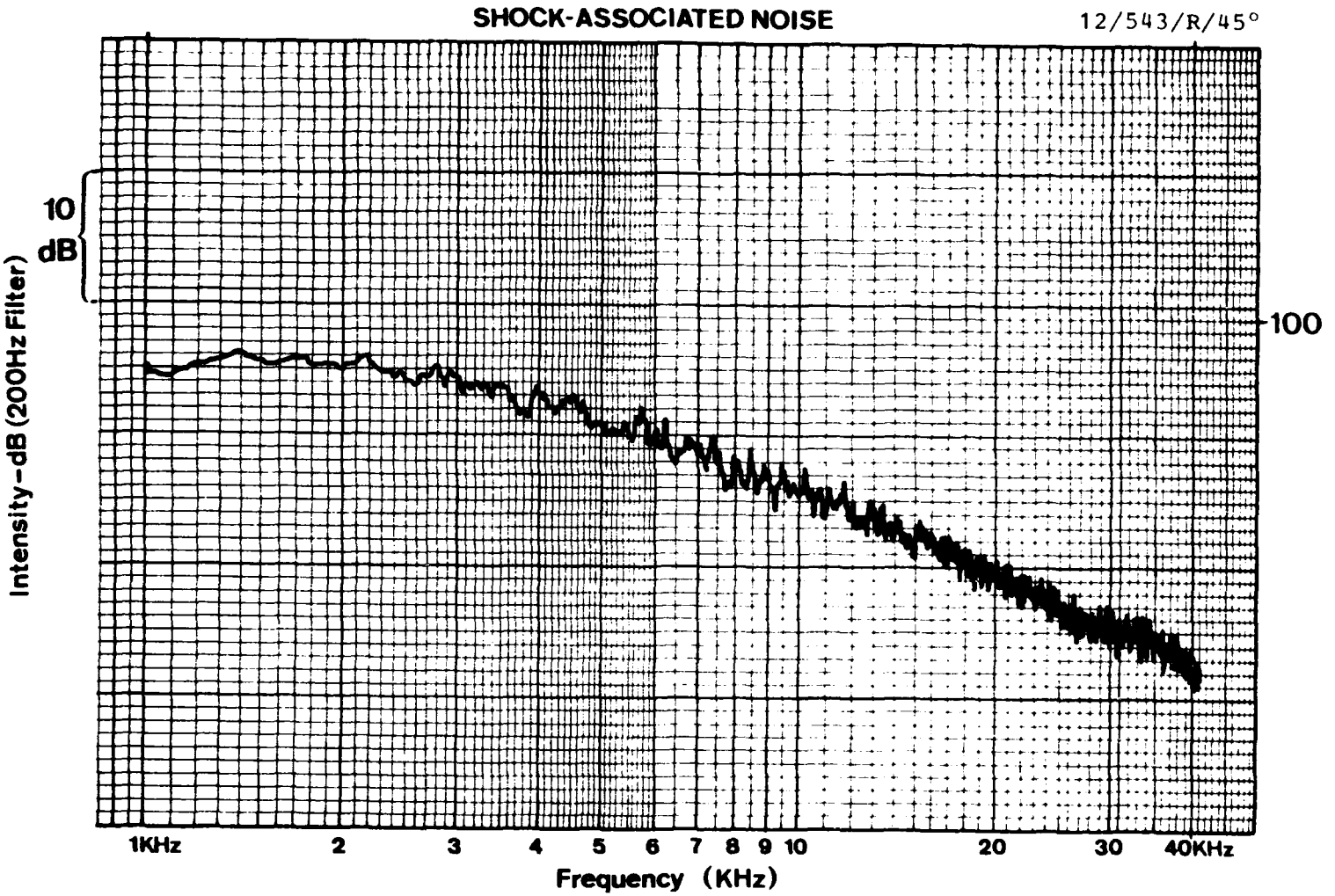
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
12/543/R/45°
10
dB
Intensity-dB (200Hz Filter)
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1KHz
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3
4
5
6
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9
10
20
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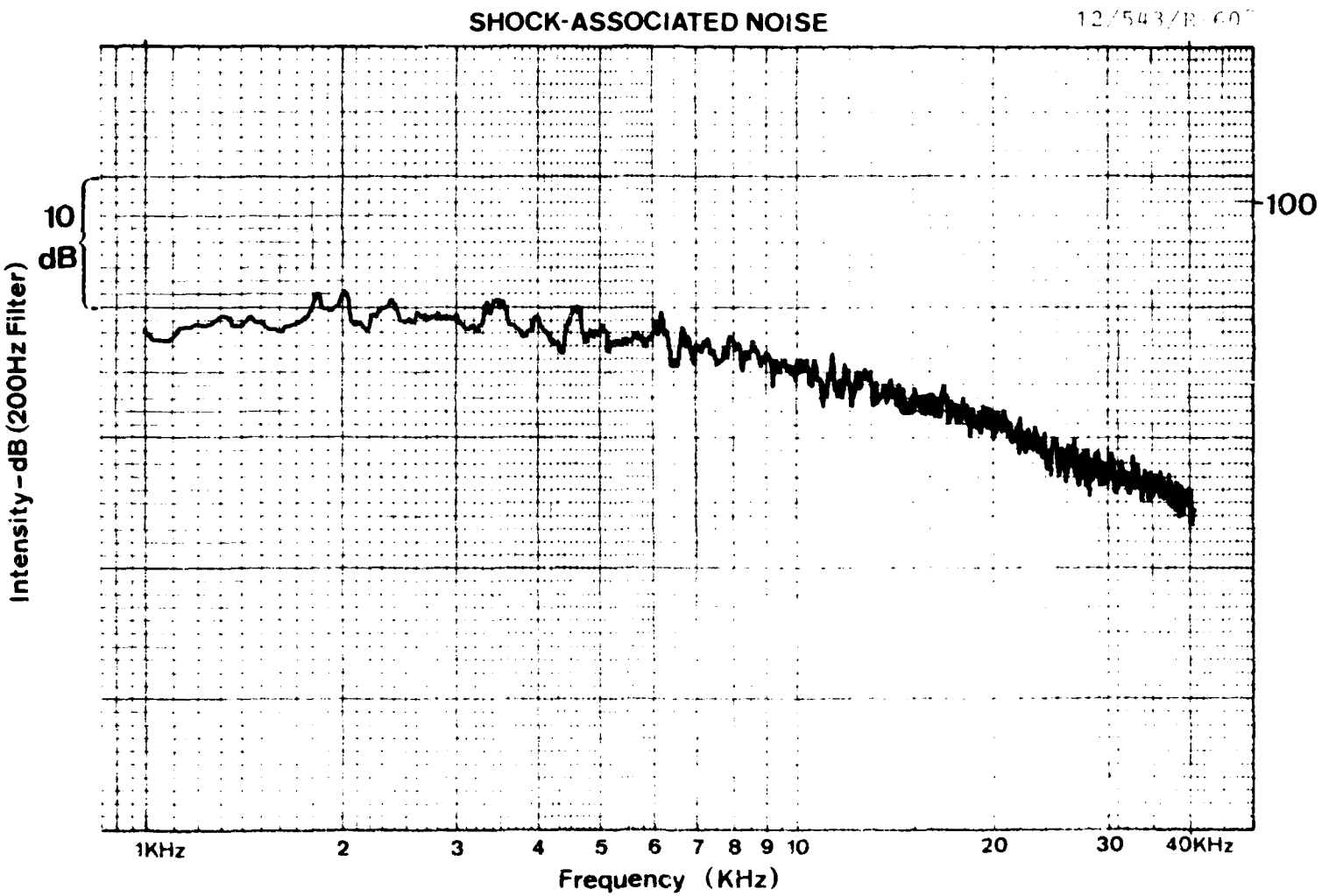
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
12/543/R-60
10
dB
100
Intensity-dB (200Hz Filter)
1KHz
2
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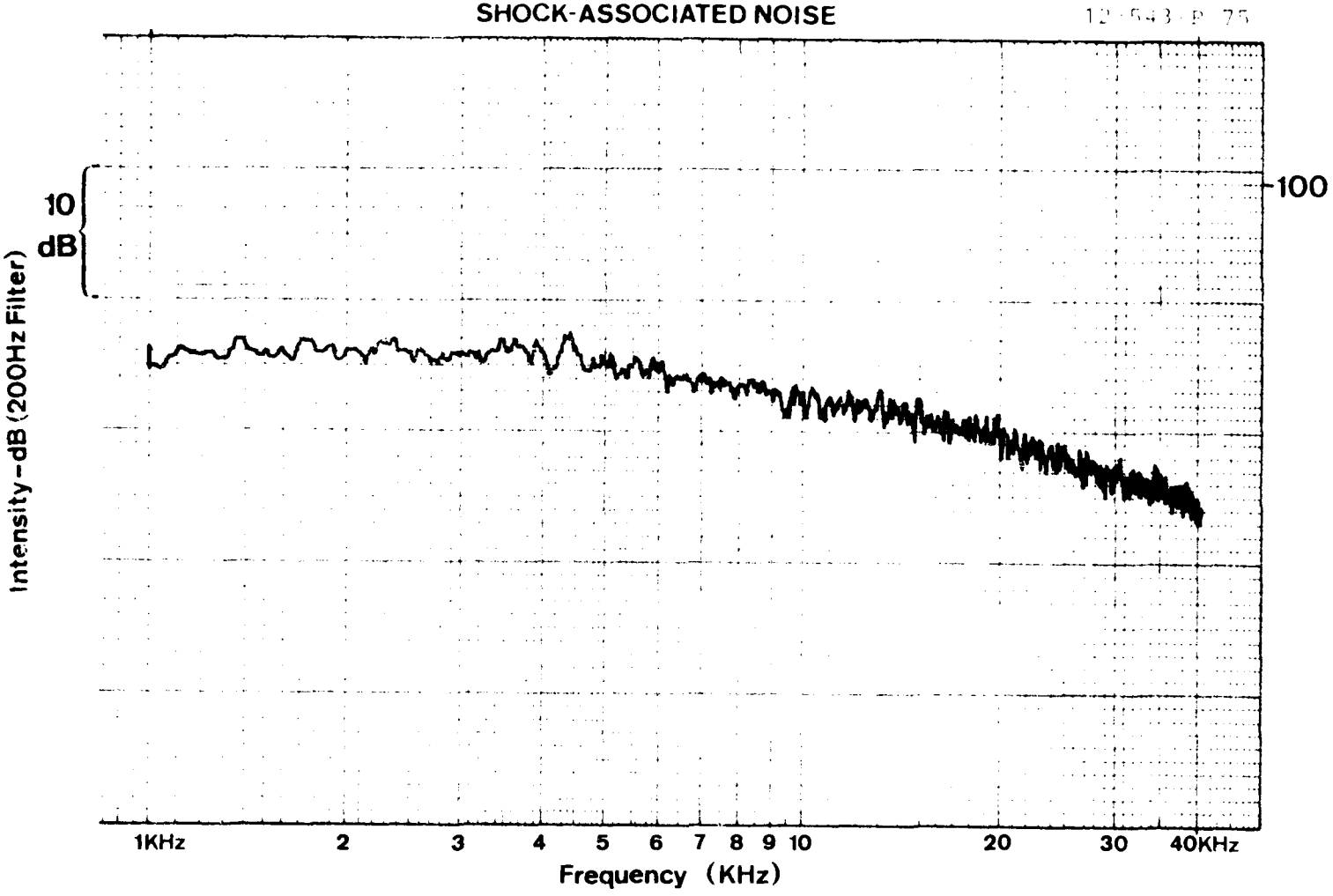
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
12-543-P 75
10
dB
100
Intensity-dB (200Hz Filter)
1KHz
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9
10
20
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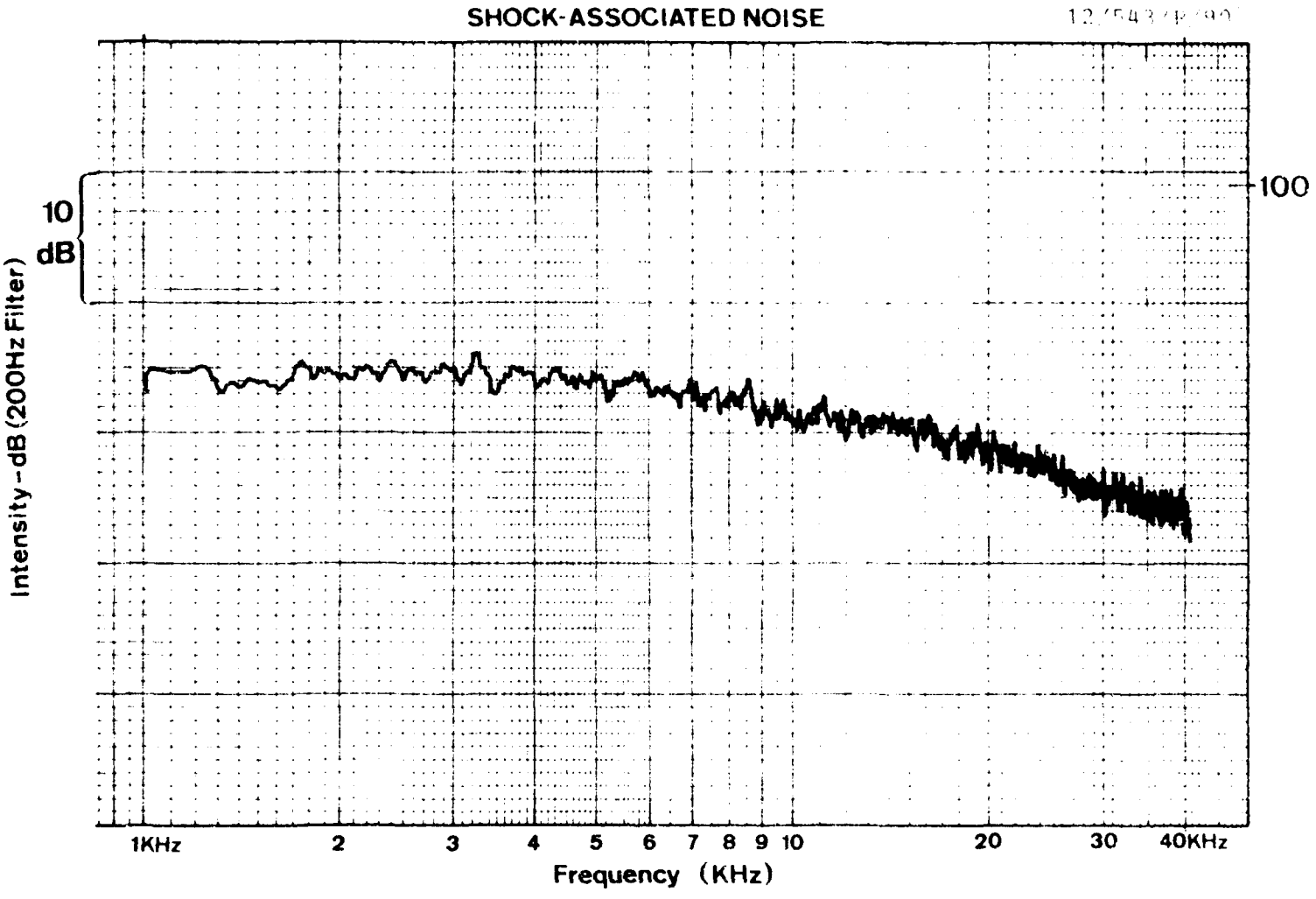
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
100
10
dB
Intensity - dB (200Hz Filter)
1KHz
2
3
4
5
6
7
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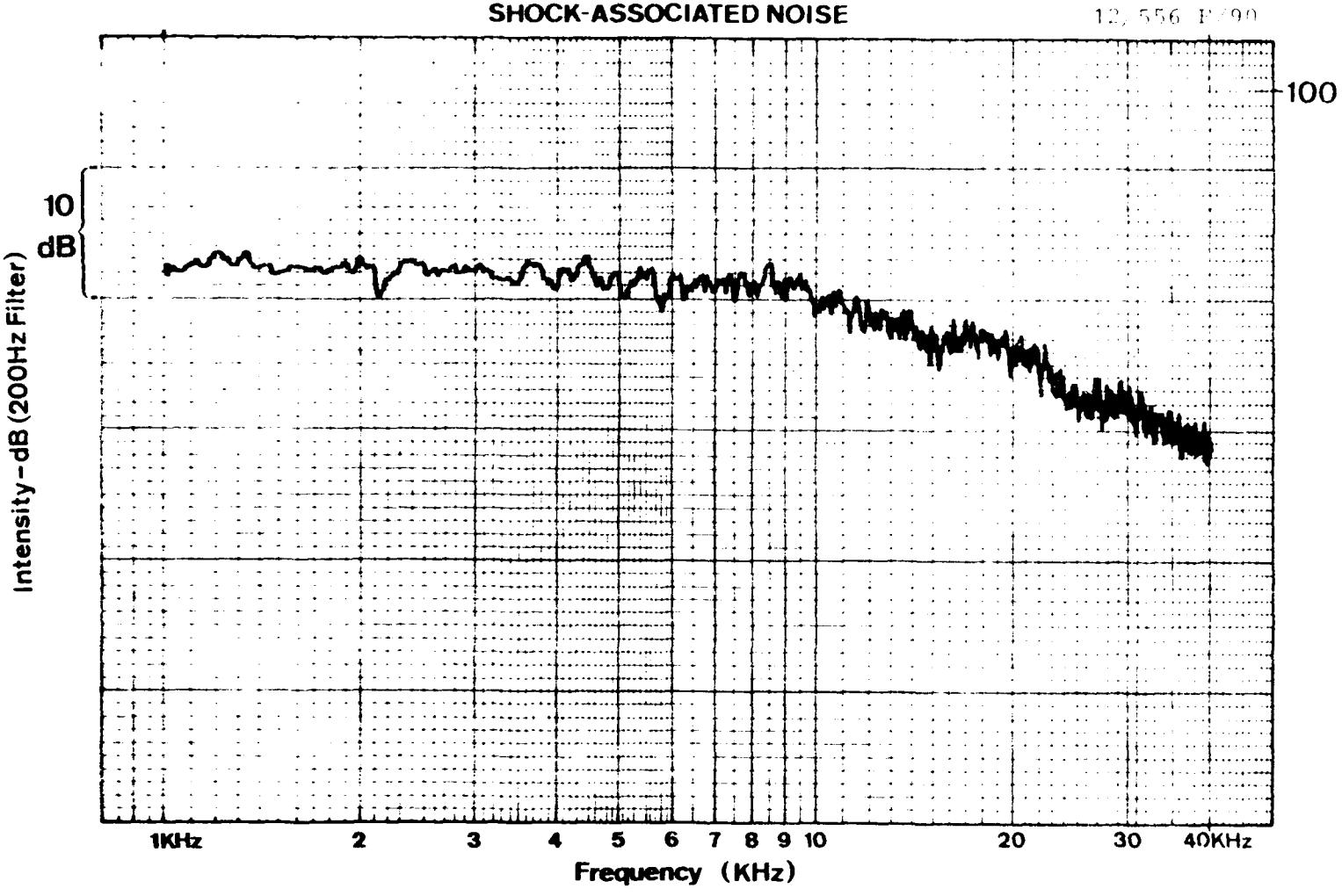
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
12,556 P/90
100
10
dB
Intensity - dB (200Hz Filter)
1KHz
2
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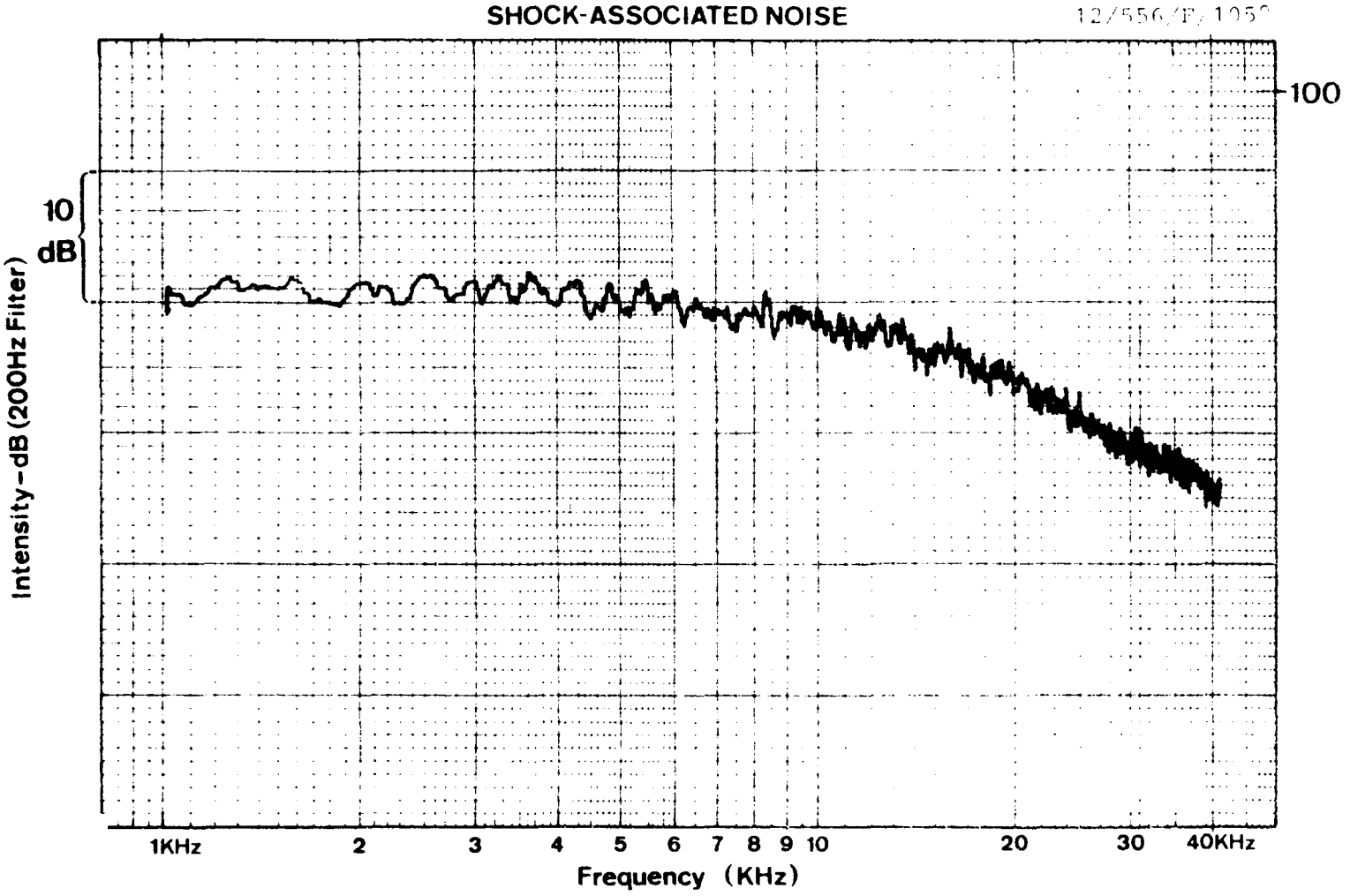
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
12/556/F/105
100
10
dB
Intensity-dB (200Hz Filter)
1KHz
2
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20
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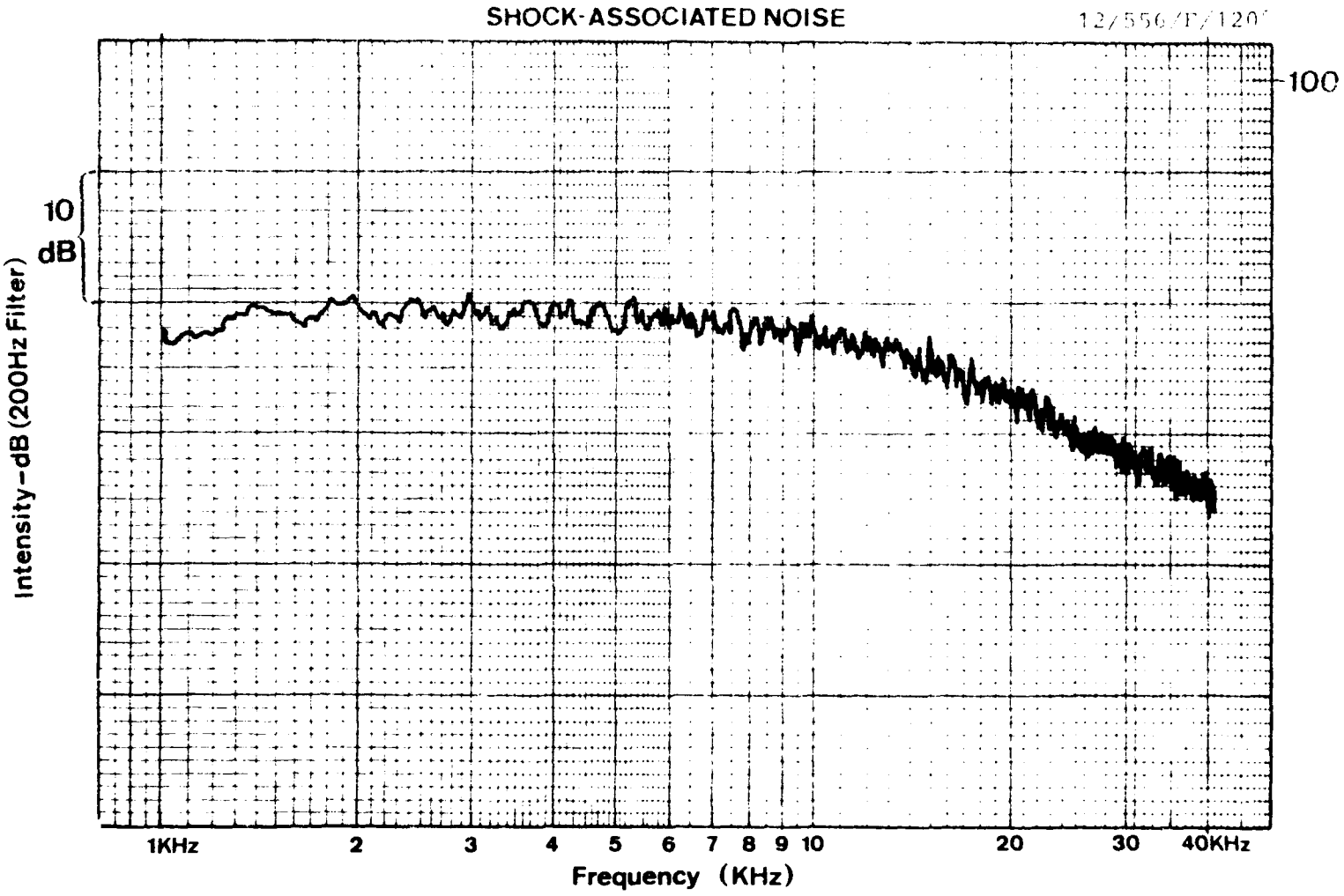
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
12/556/F/120
100
10
dB
Intensity-dB (200Hz Filter)
1KHz
2
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9
10
20
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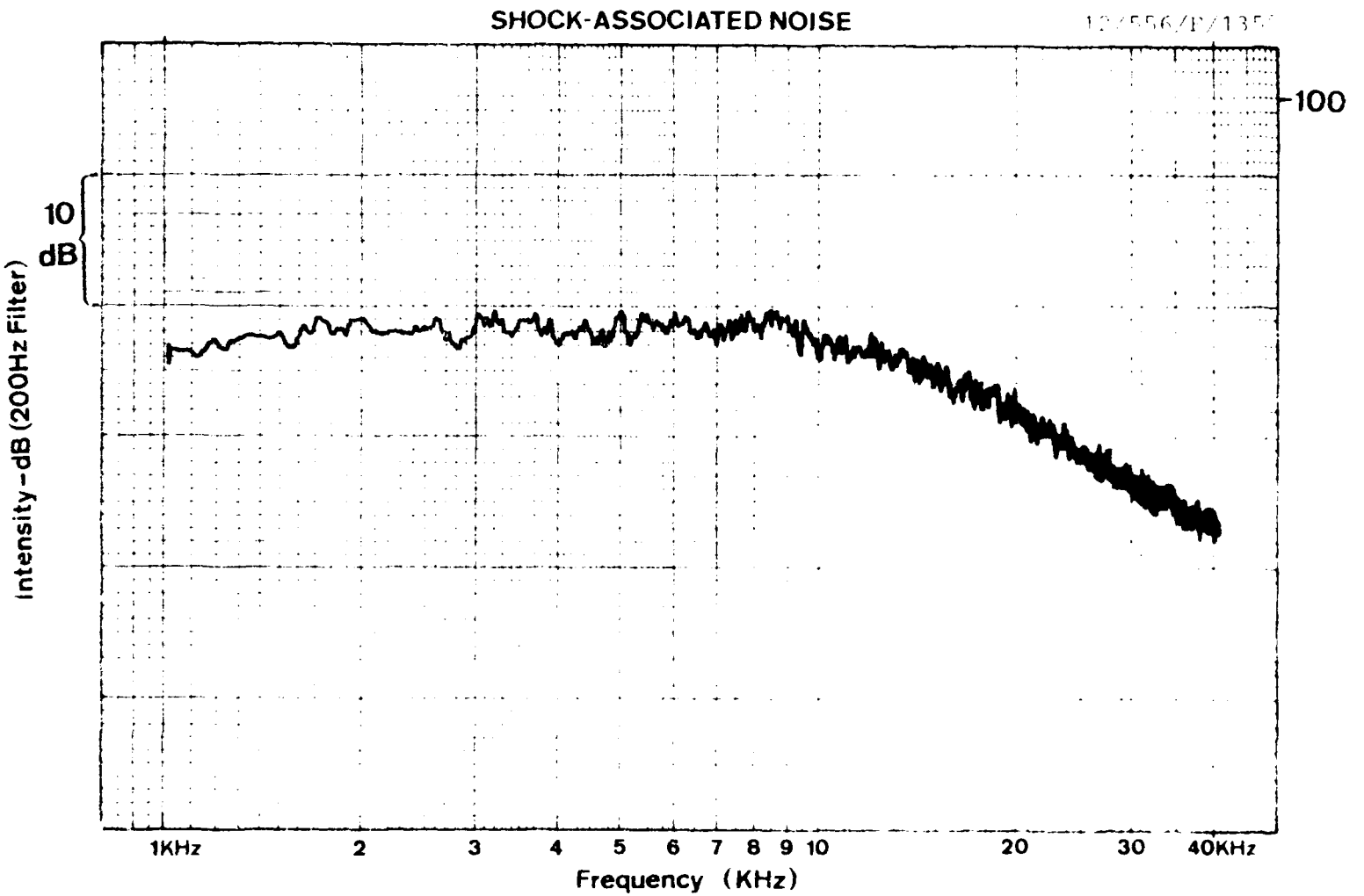
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
100
10
dB
Intensity - dB (200Hz Filter)
1KHz
2
3
4
5
6
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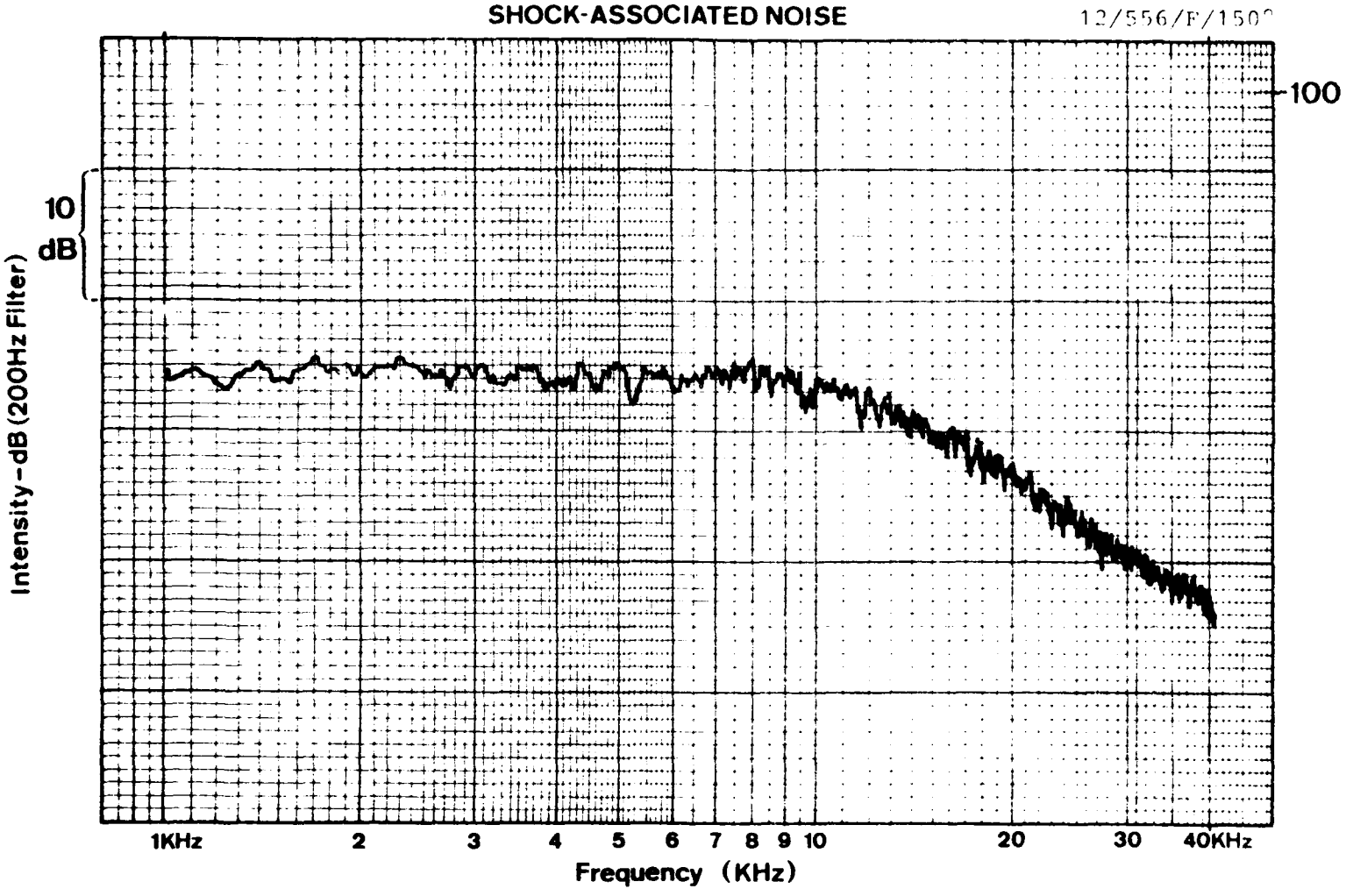
8
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
12/556/F/150°
100
10
dB
Intensity - dB (200Hz Filter)
1KHz
2
3
4
5
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7
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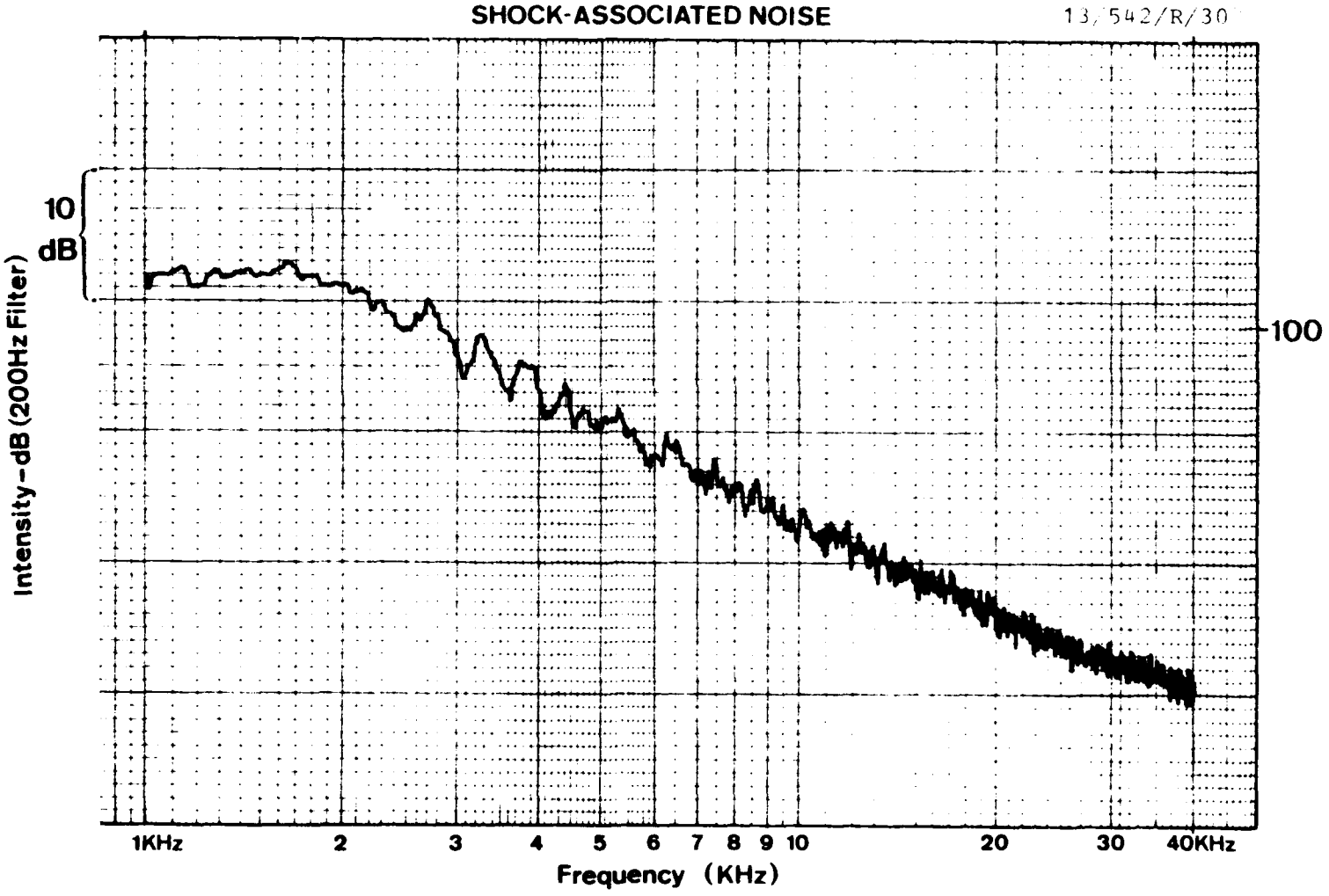
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
13,542/R/30
10
dB
Intensity-dB (200Hz Filter)
100
1KHz
2
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4
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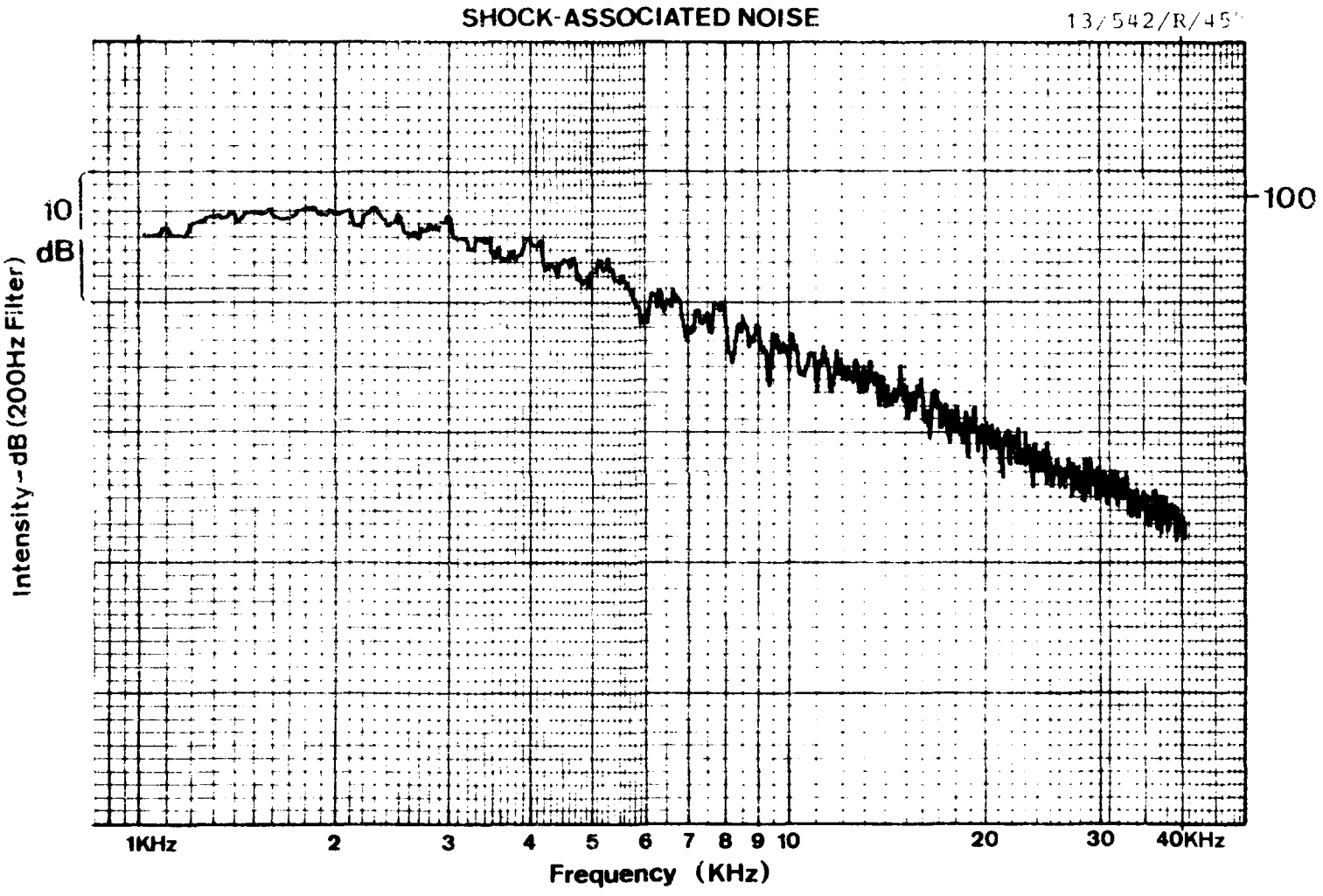
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
13/542/R/45
10
dB
100
Intensity - dB (200Hz Filter)
1KHz
2
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4
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6
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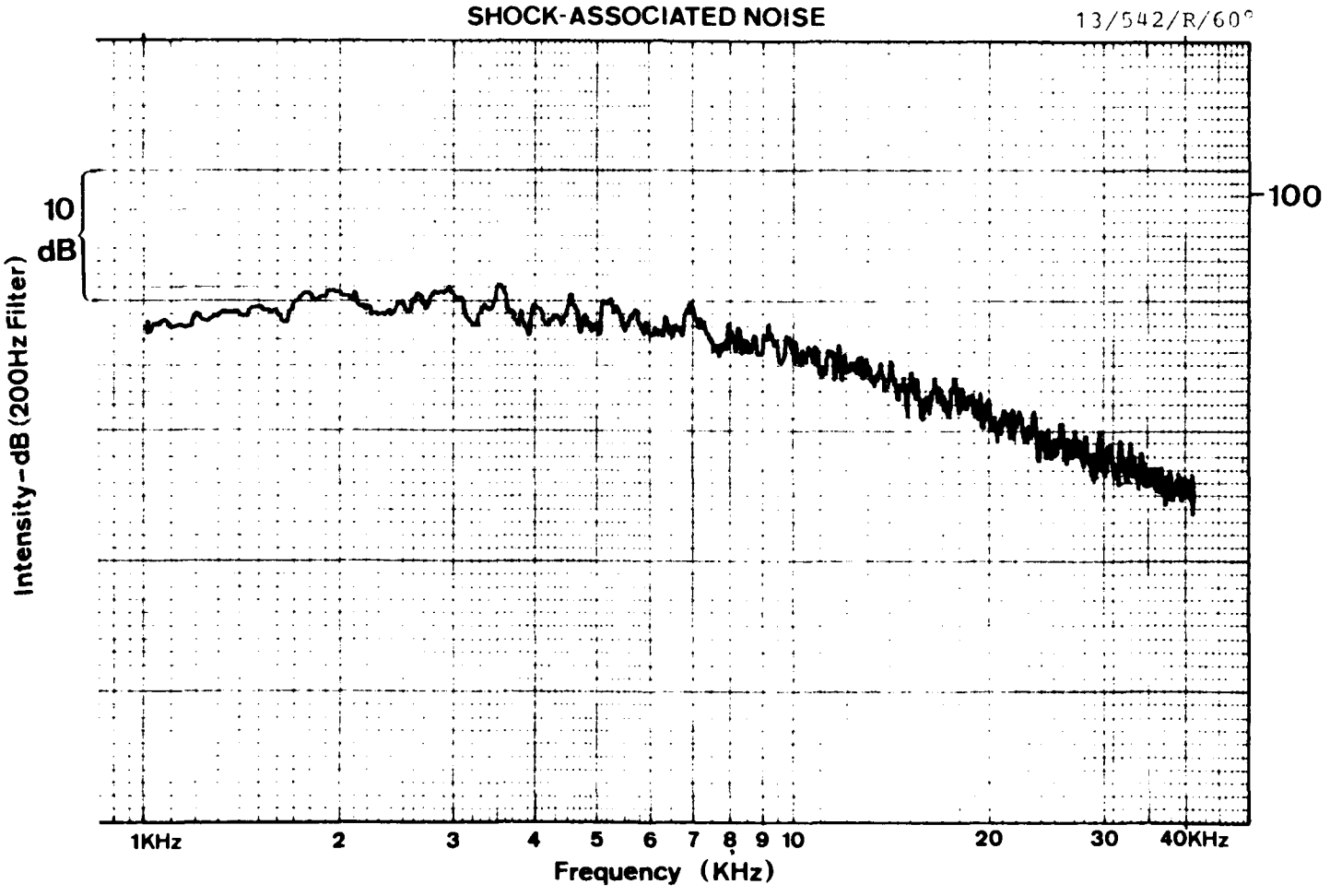
8
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
13/542/R/60°
10
dB
100
Intensity-dB (200Hz Filter)
1KHz
2
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4
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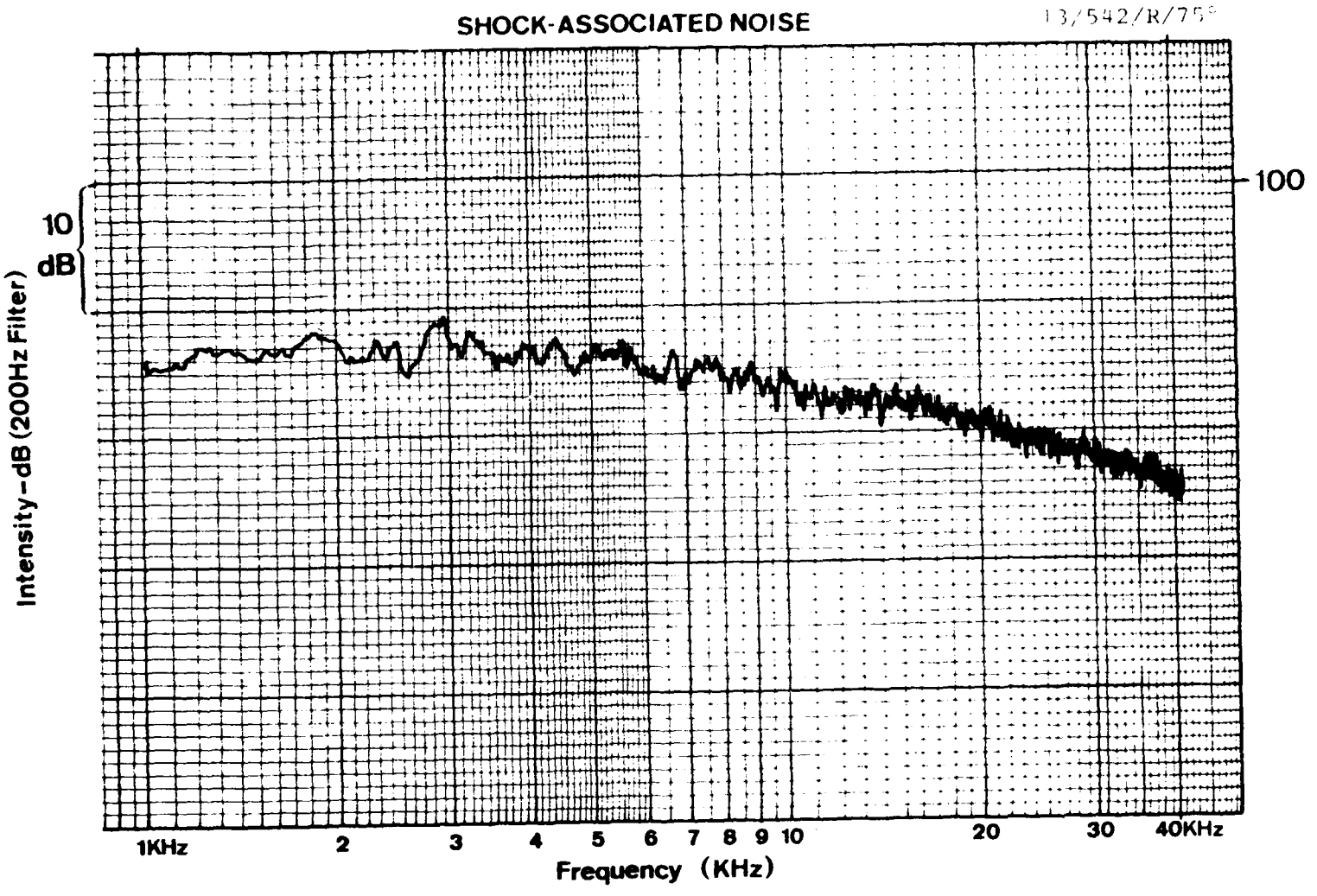
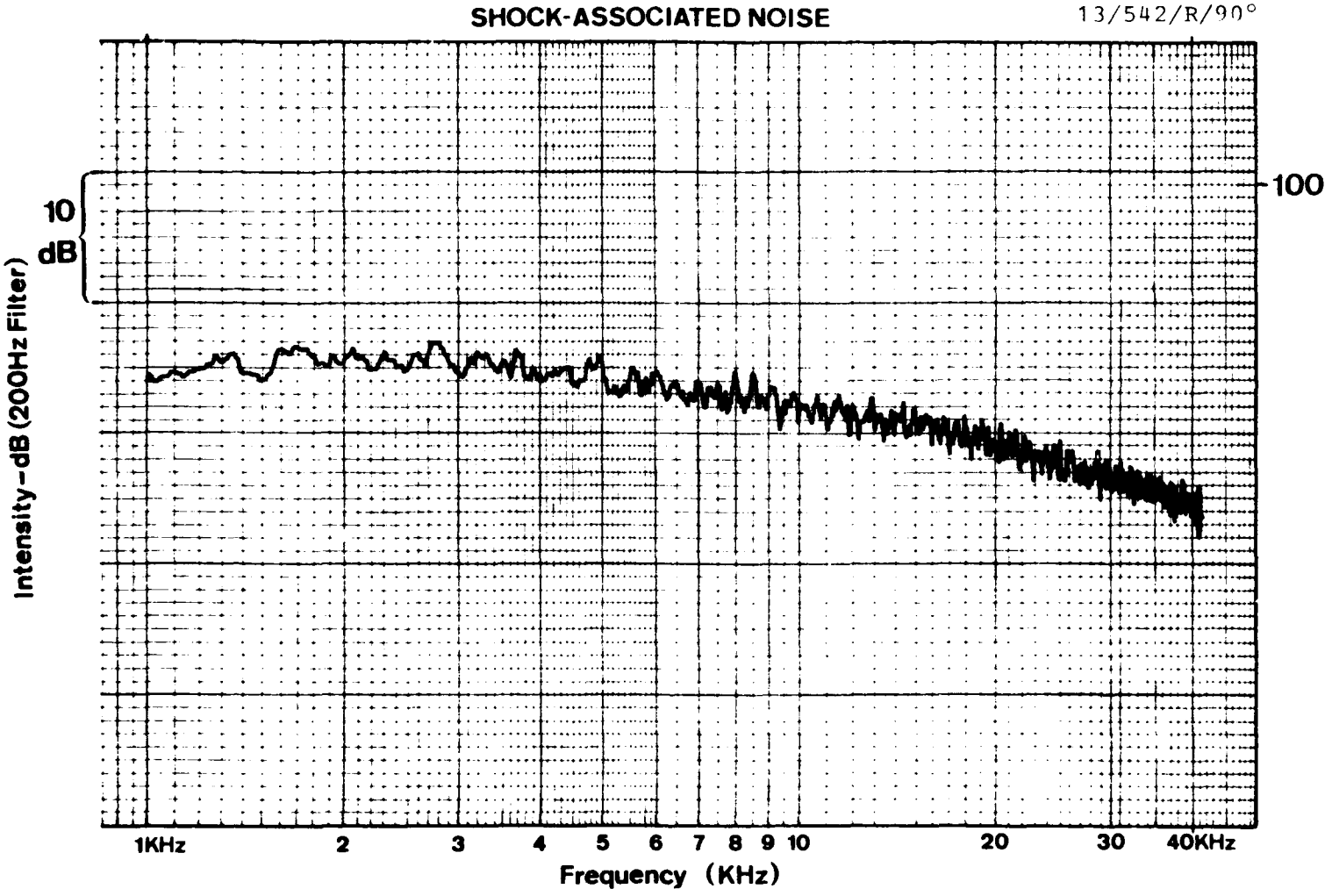
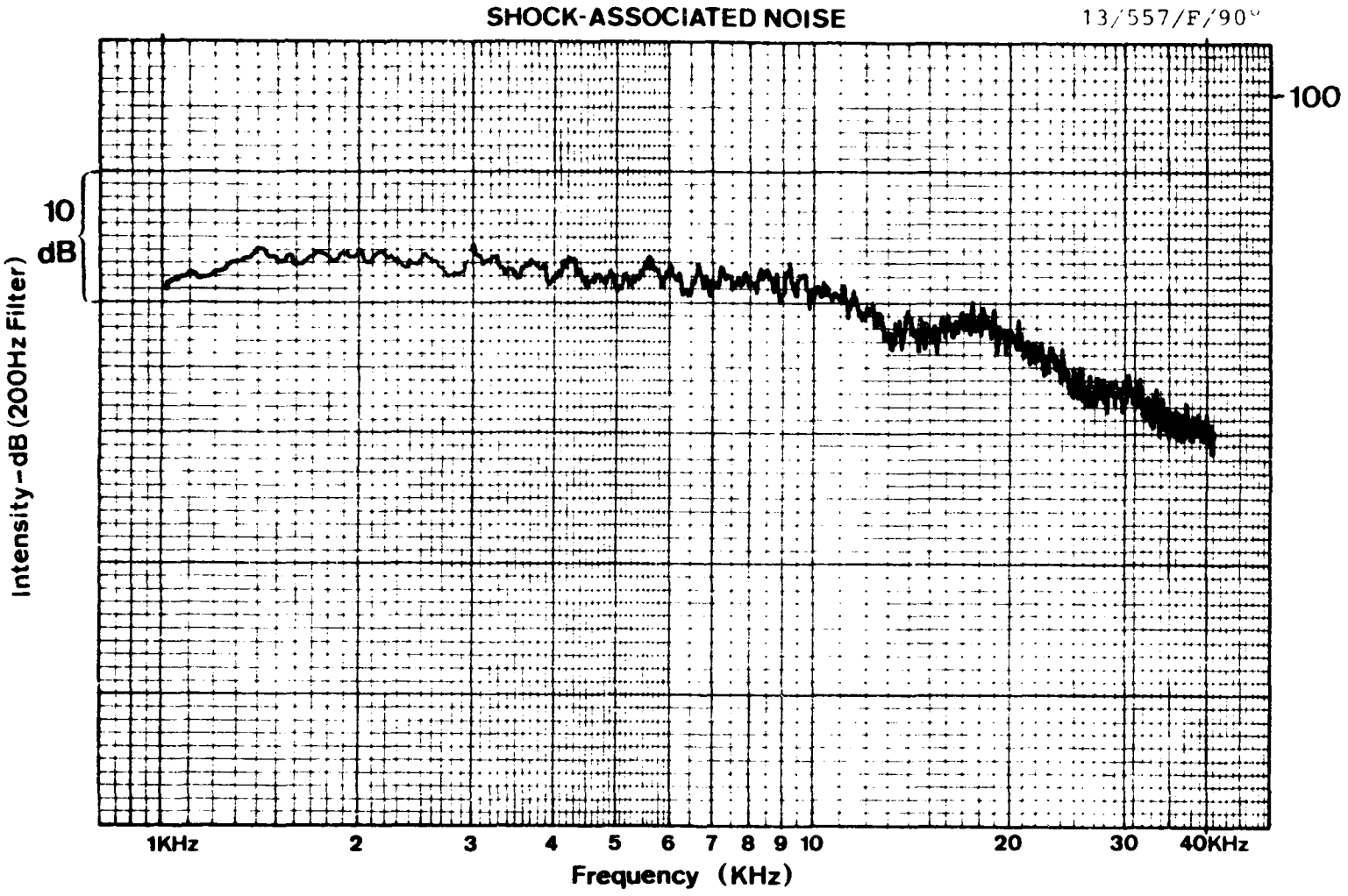
6
7
8
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
13/542/R/75
100
10
dB
Intensity-dB (200Hz Filter)
1KHz
2
3
4
5
6
7
8
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
13/542/R/90°
100
10
dB
Intensity-dB (200Hz Filter)
1KHz
2
3
4
5
6
7
8
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
13/557/F/90°
100
10
dB
Intensity-dB (200Hz Filter)
1KHz
2
3
4
5
6
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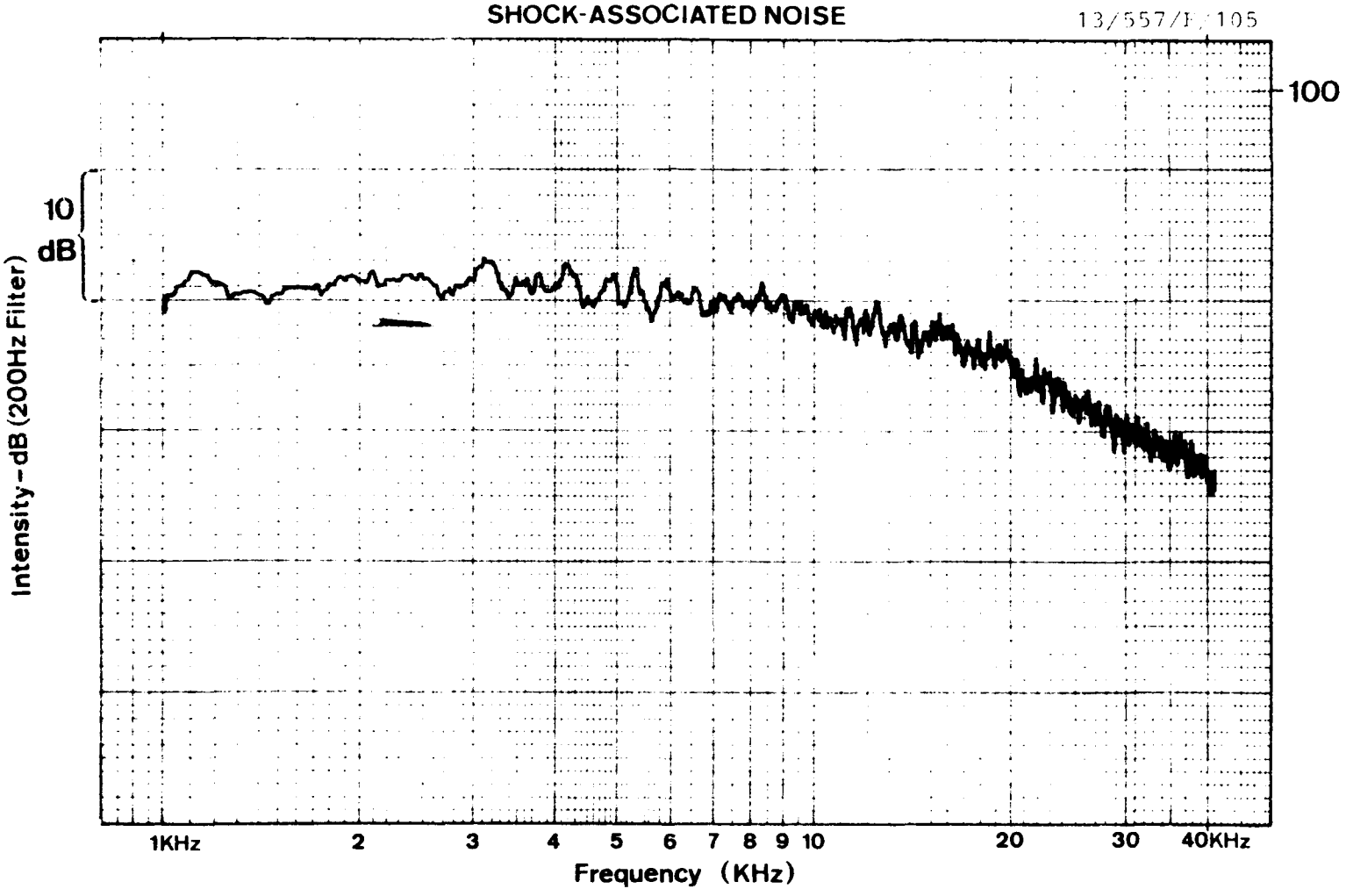
8
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
13/557/F/105
100
10
dB
Intensity - dB (200Hz Filter)
1KHz
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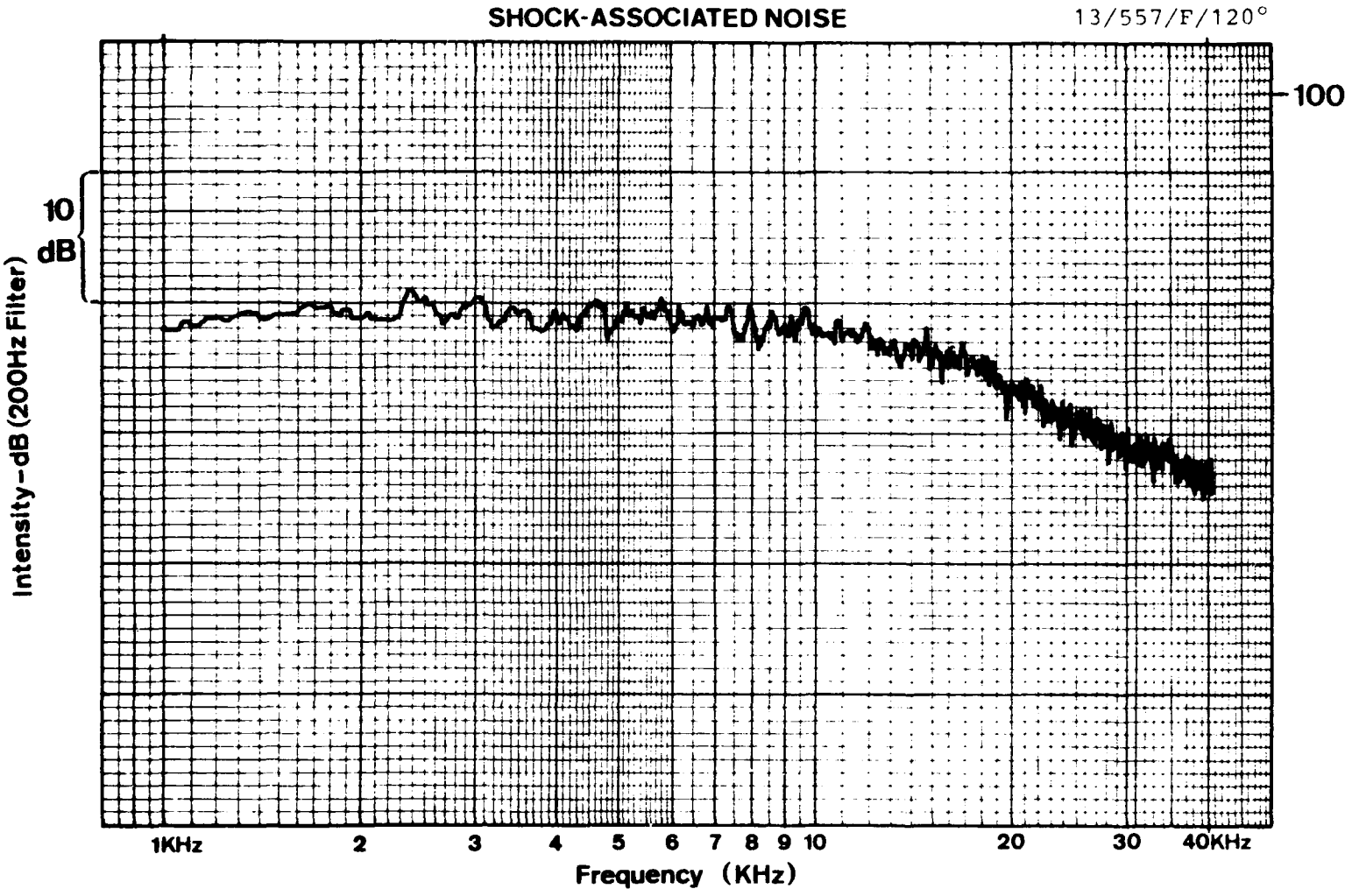
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
13/557/F/120°
100
10
dB
Intensity-dB (200Hz Filter)
1KHz
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9
10
20
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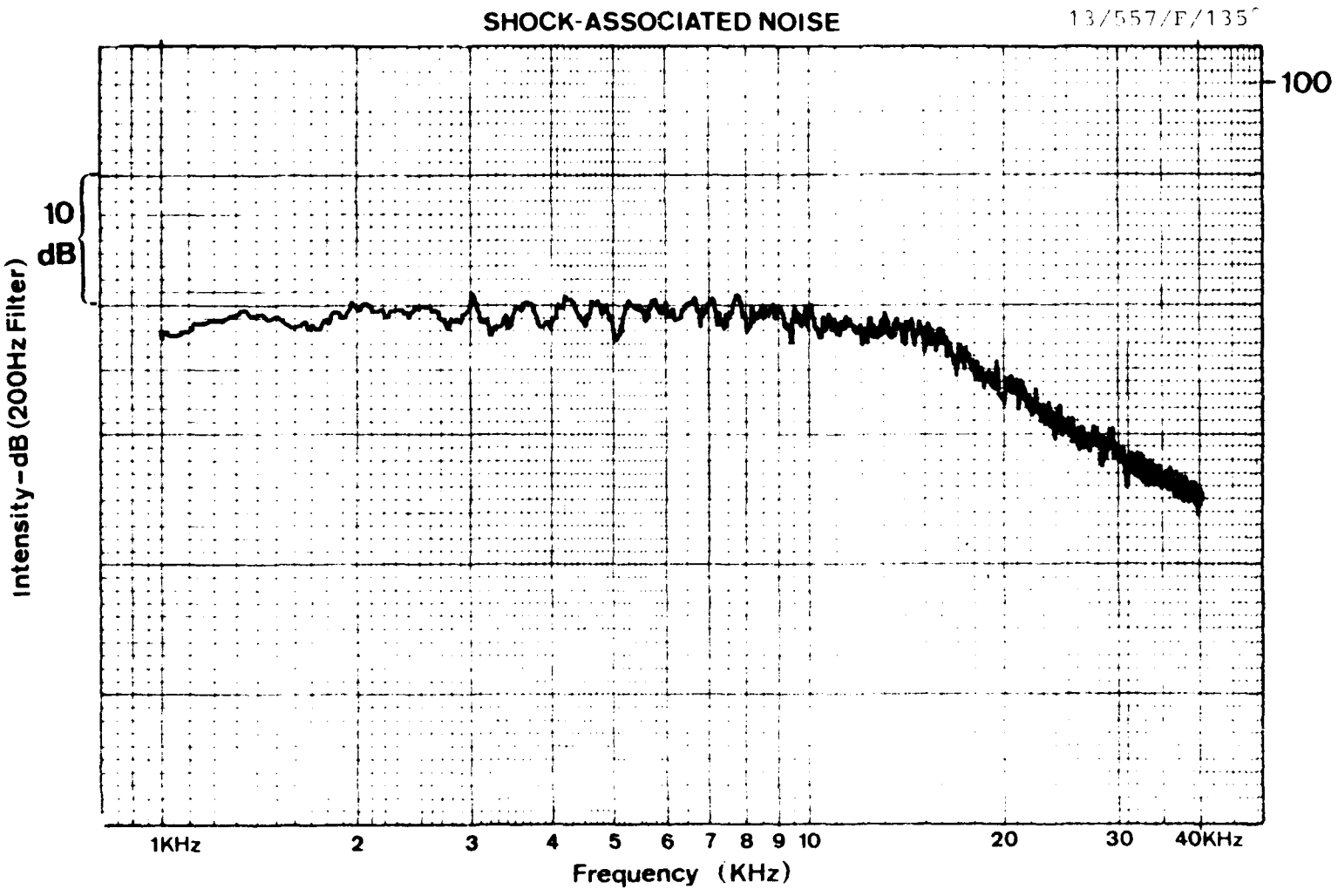
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
13/557/F/135
100
10
dB
Intensity-dB (200Hz Filter)
1KHz
2
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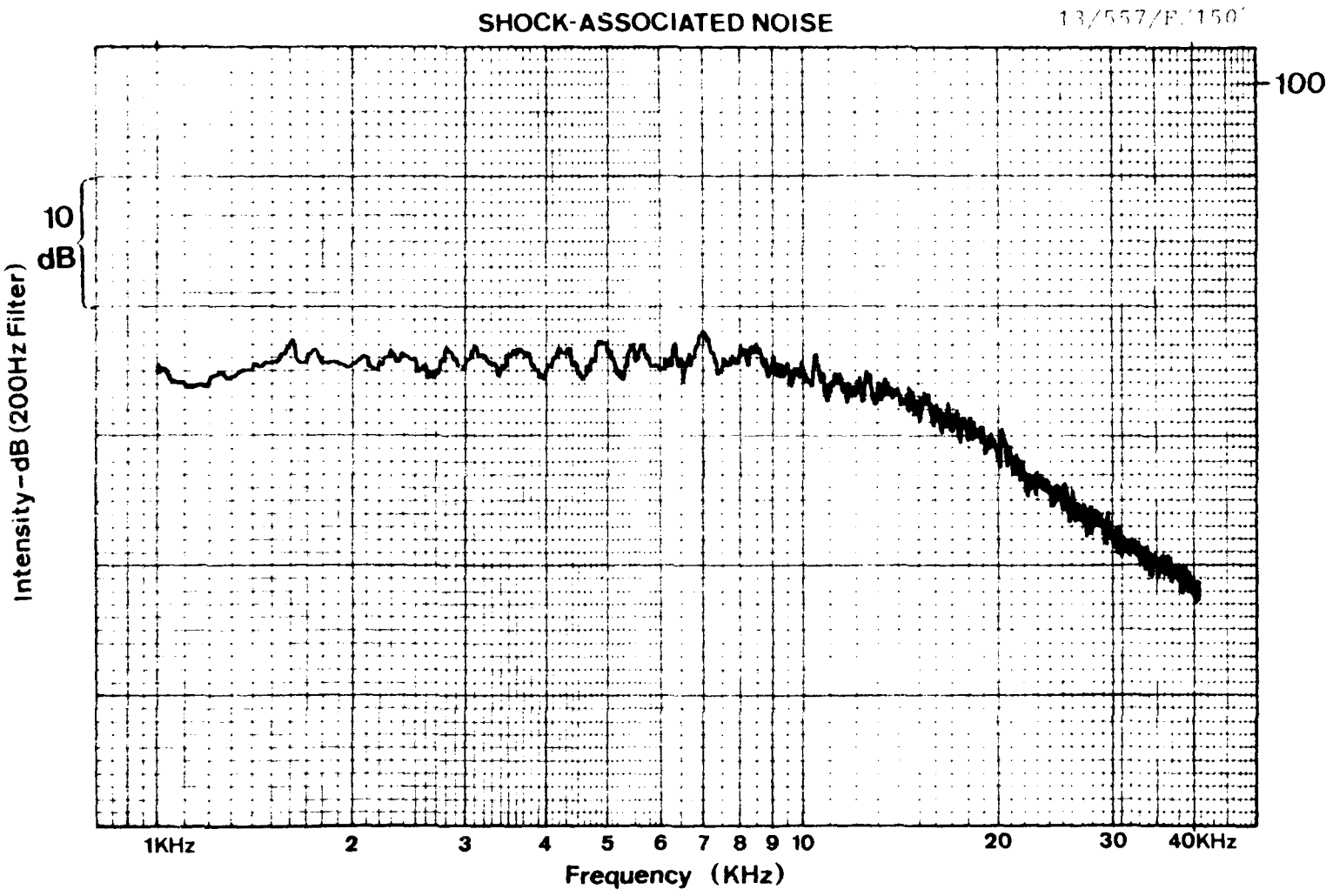
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
13/557/F/150
100
10
dB
Intensity-dB (200Hz Filter)
1KHz
2
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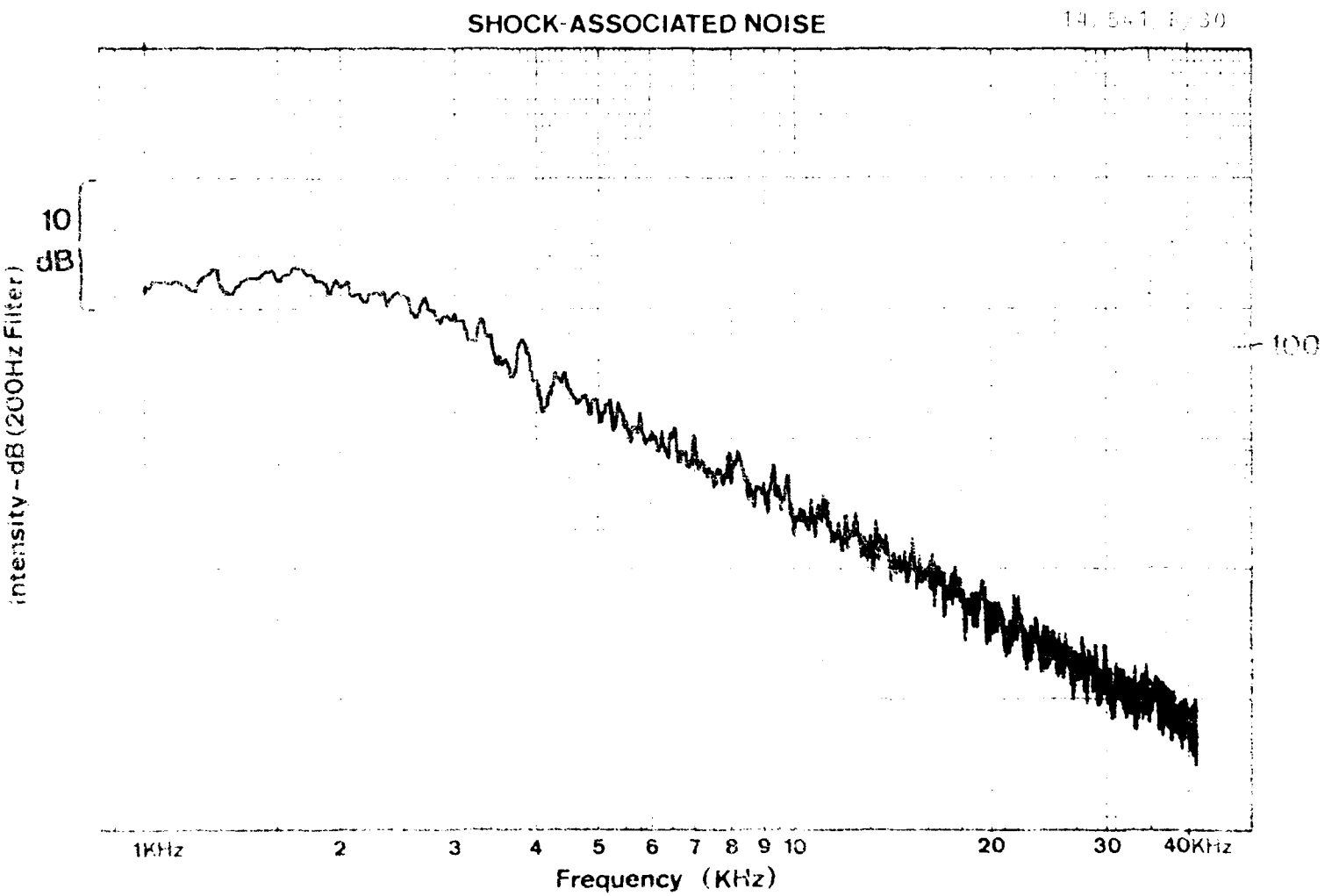
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
10
dB
Intensity - dB (200Hz Filter)
100
1KHz
2
3
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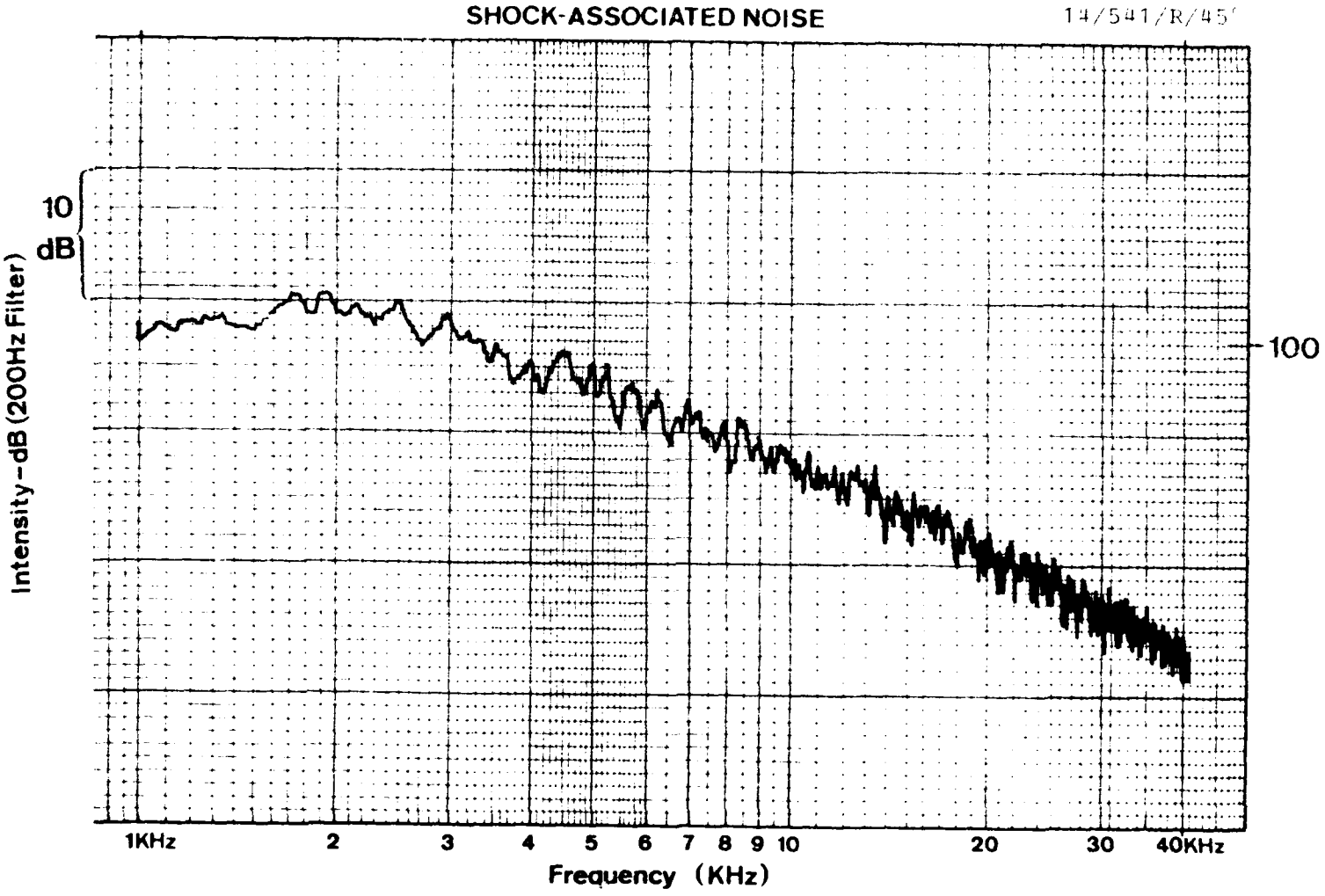
8
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
14/541/R/45'
10
dB
Intensity-dB (200Hz Filter)
100
1KHz
2
3
4
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7
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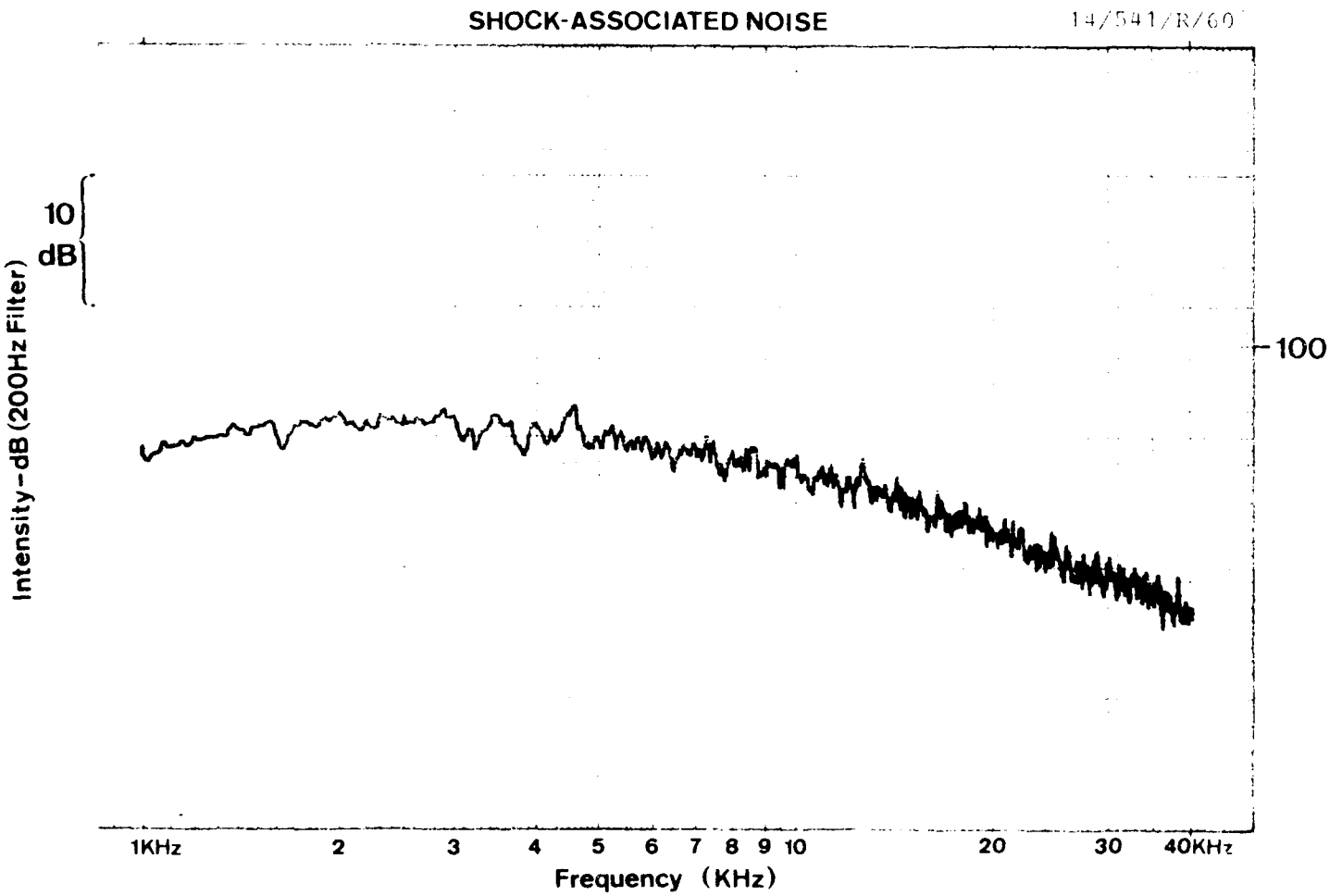
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
14/541/R/60
10
dB
Intensity-dB (200Hz Filter)
100
1KHz
2
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4
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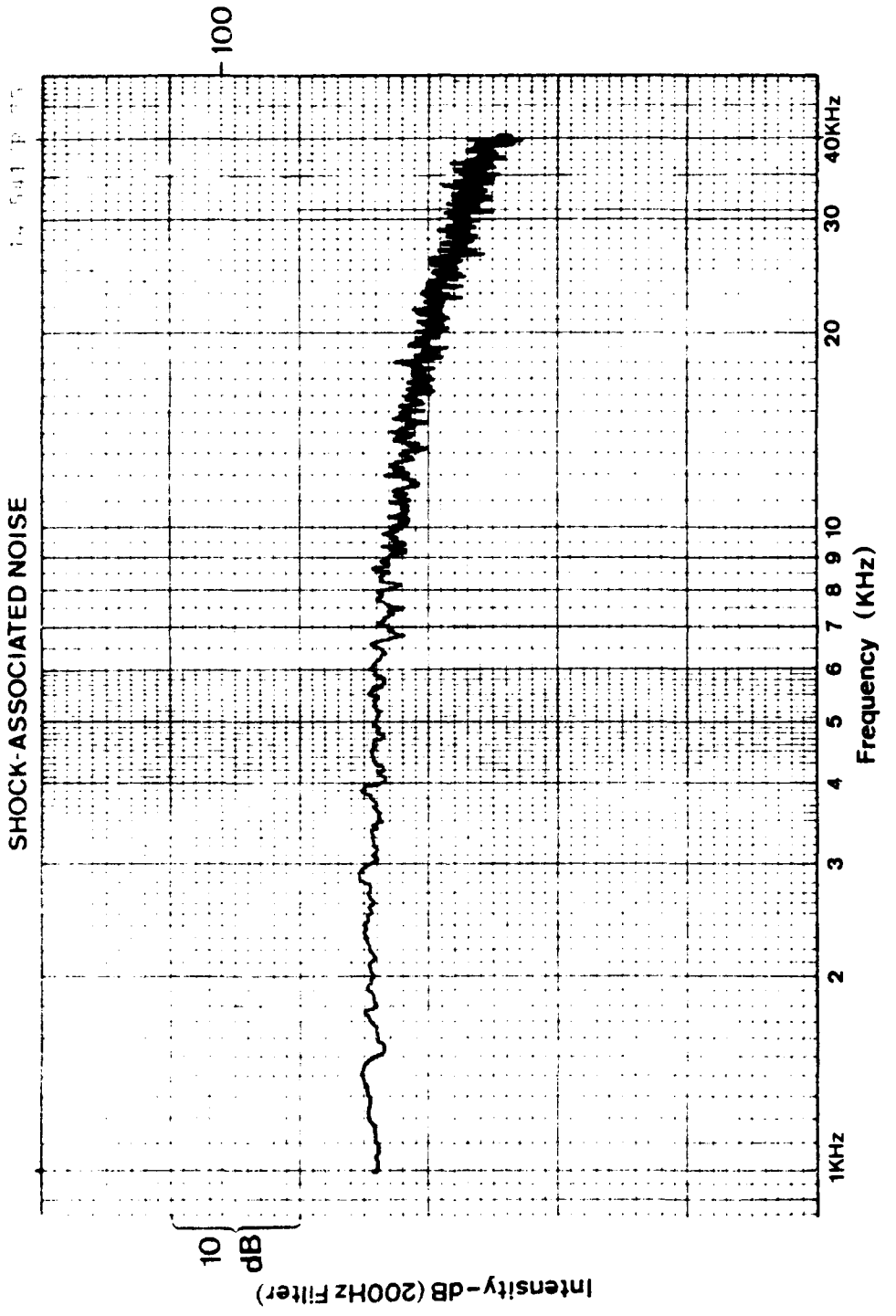
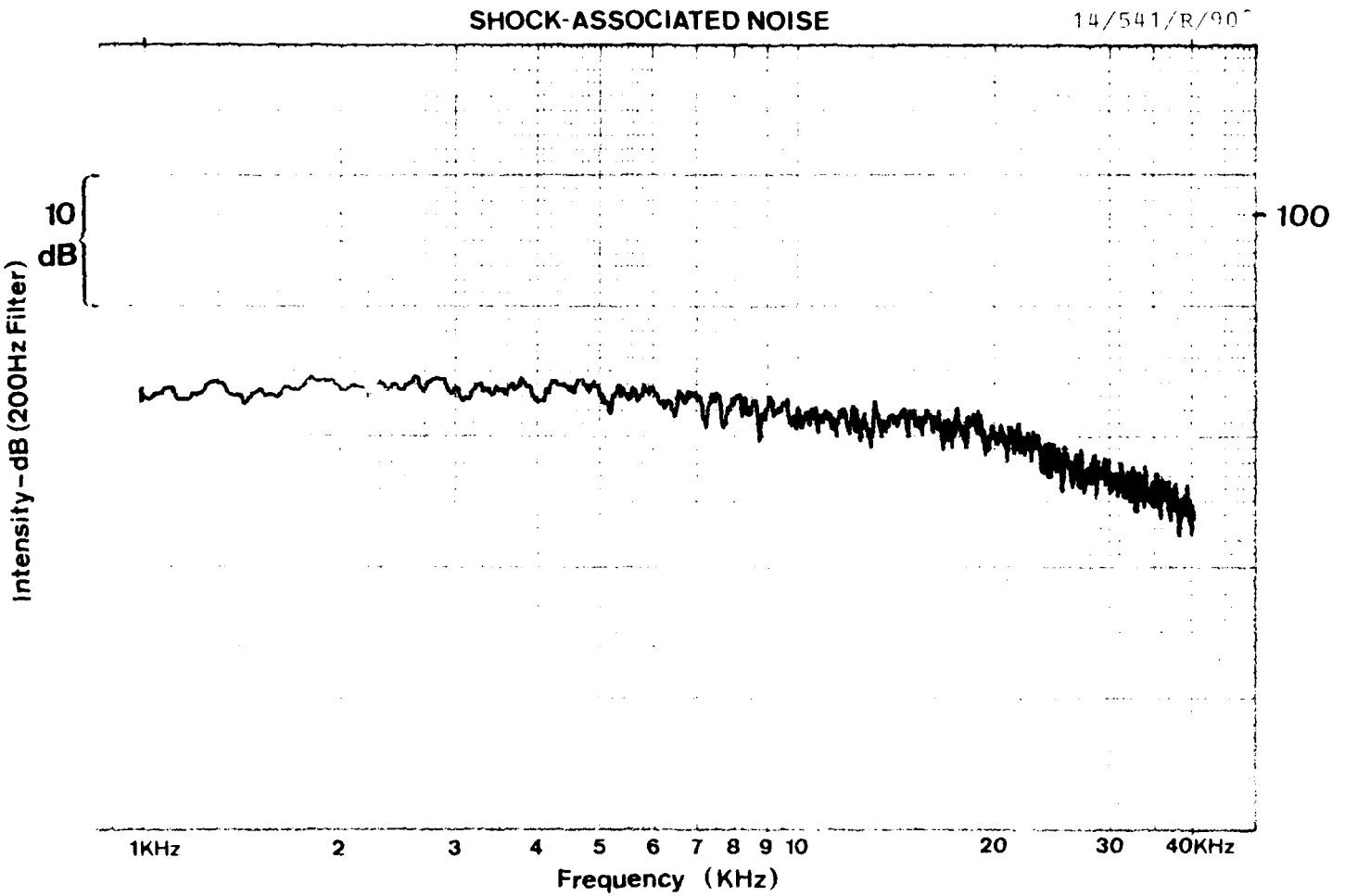
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
100
10 dB
Intensity–dB (200Hz Filter)
1KHz
2
3
4
5
6
7
8
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
14/541/R/90°
10
dB
100
Intensity - dB (200Hz Filter)
1KHz
2
3
4
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7
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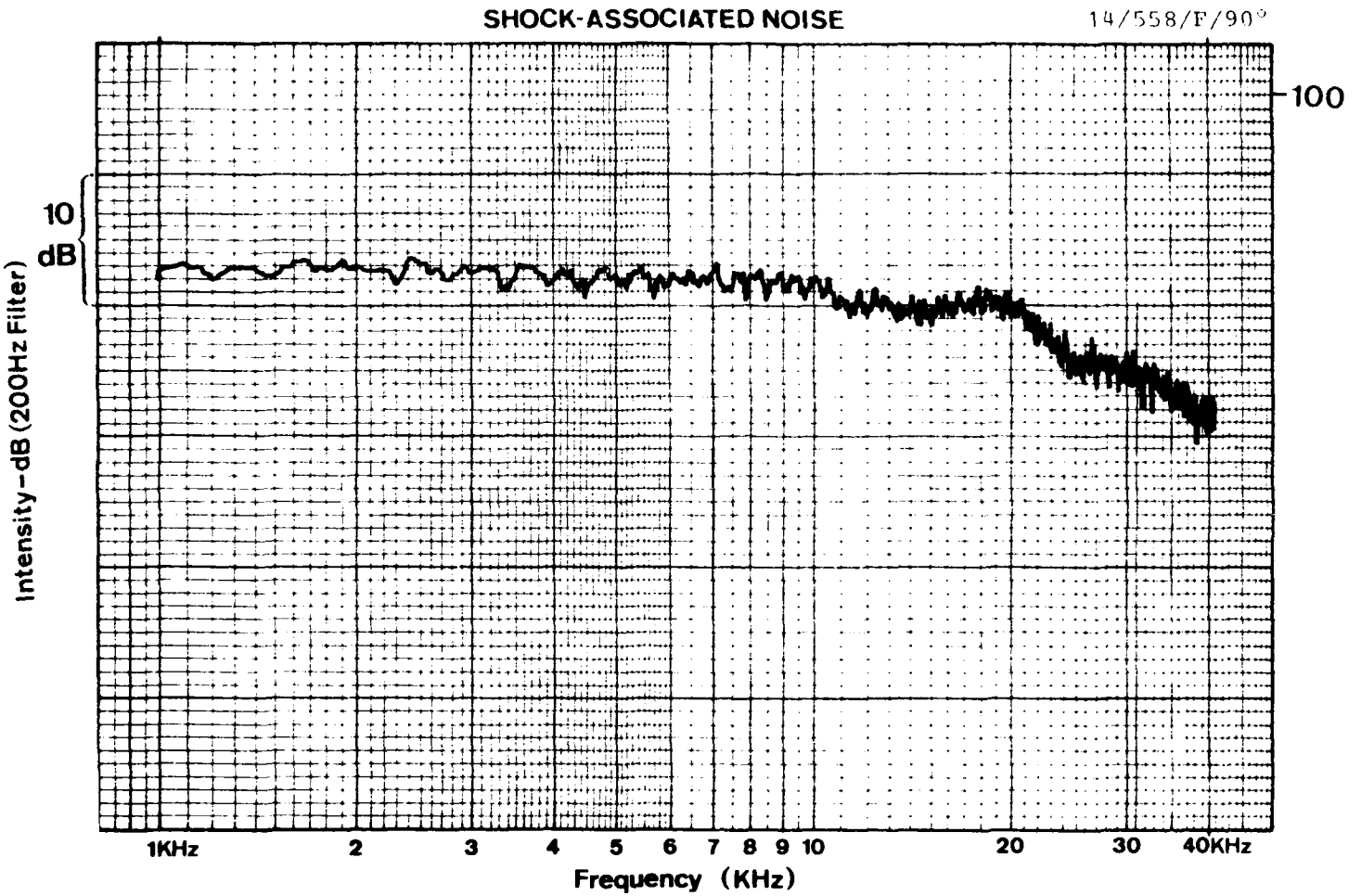
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
14/558/F/90°
100
10
dB
Intensity - dB (200Hz Filter)
1KHz
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4
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9
10
20
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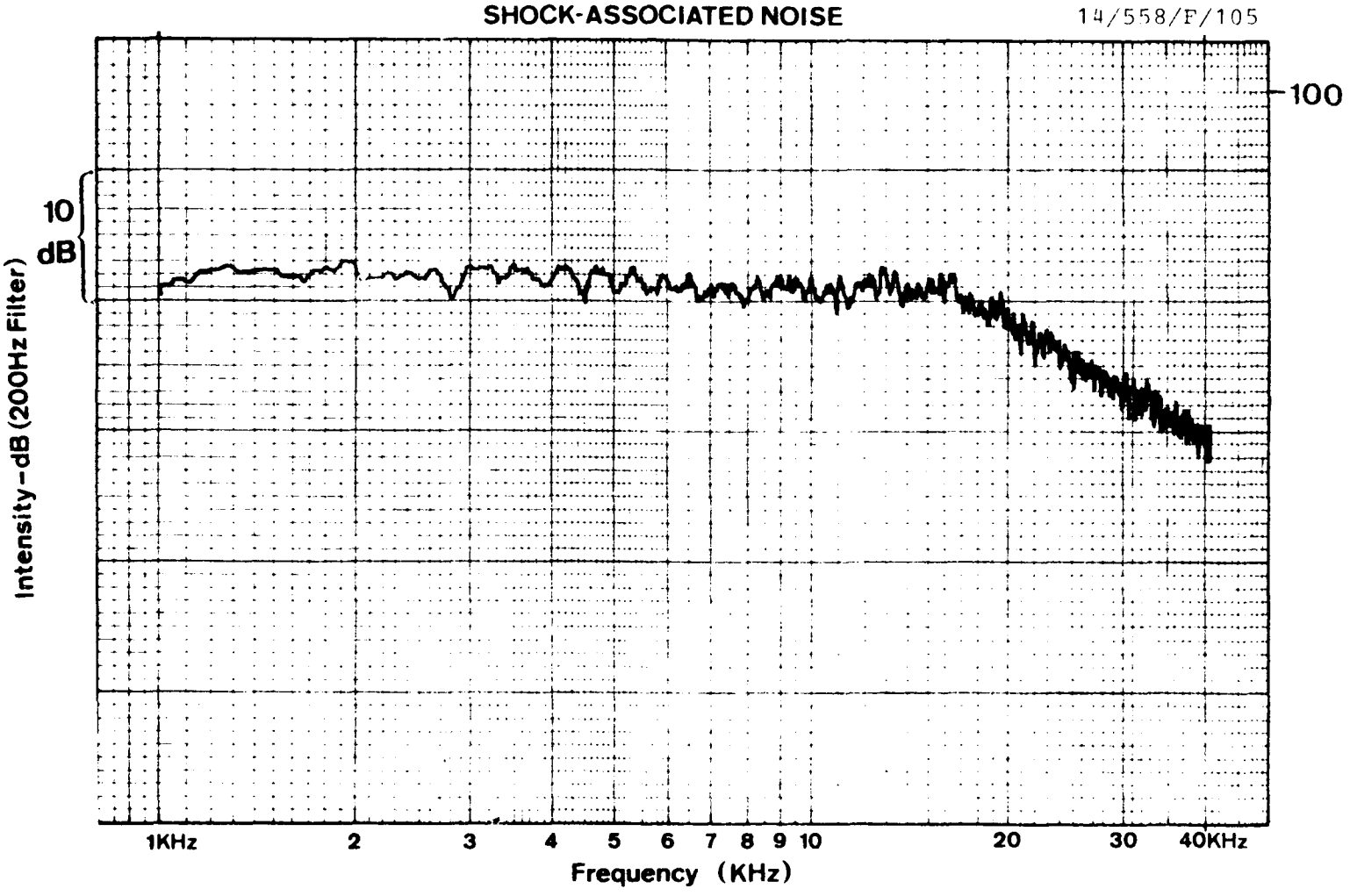
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
14/558/F/105
100
10
dB
Intensity-dB (200Hz Filter)
1KHz
2
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4
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9
10
20
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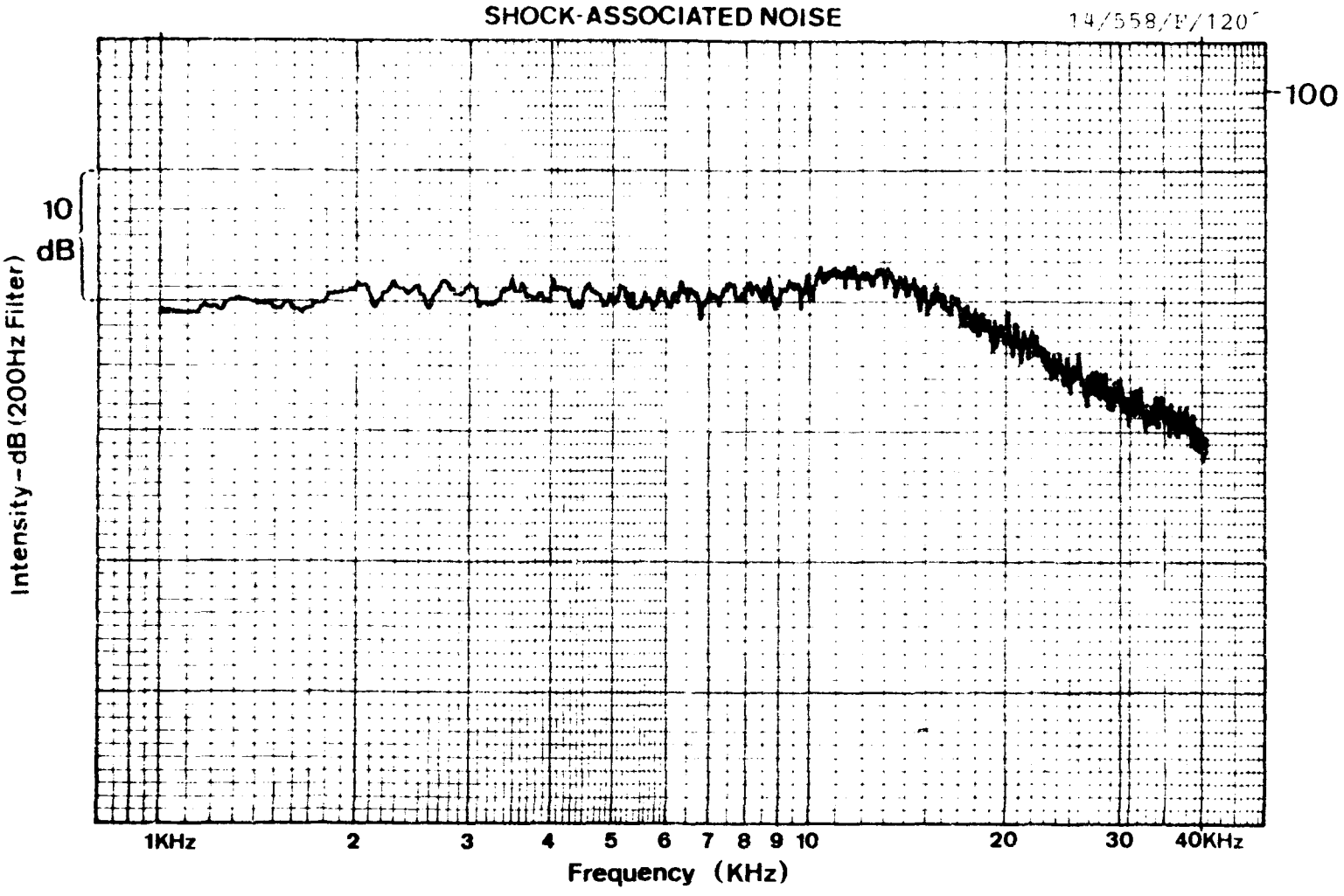
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
14/558/F/120
100
10
dB
Intensity-dB (200Hz Filter)
1KHz
2
3
4
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7
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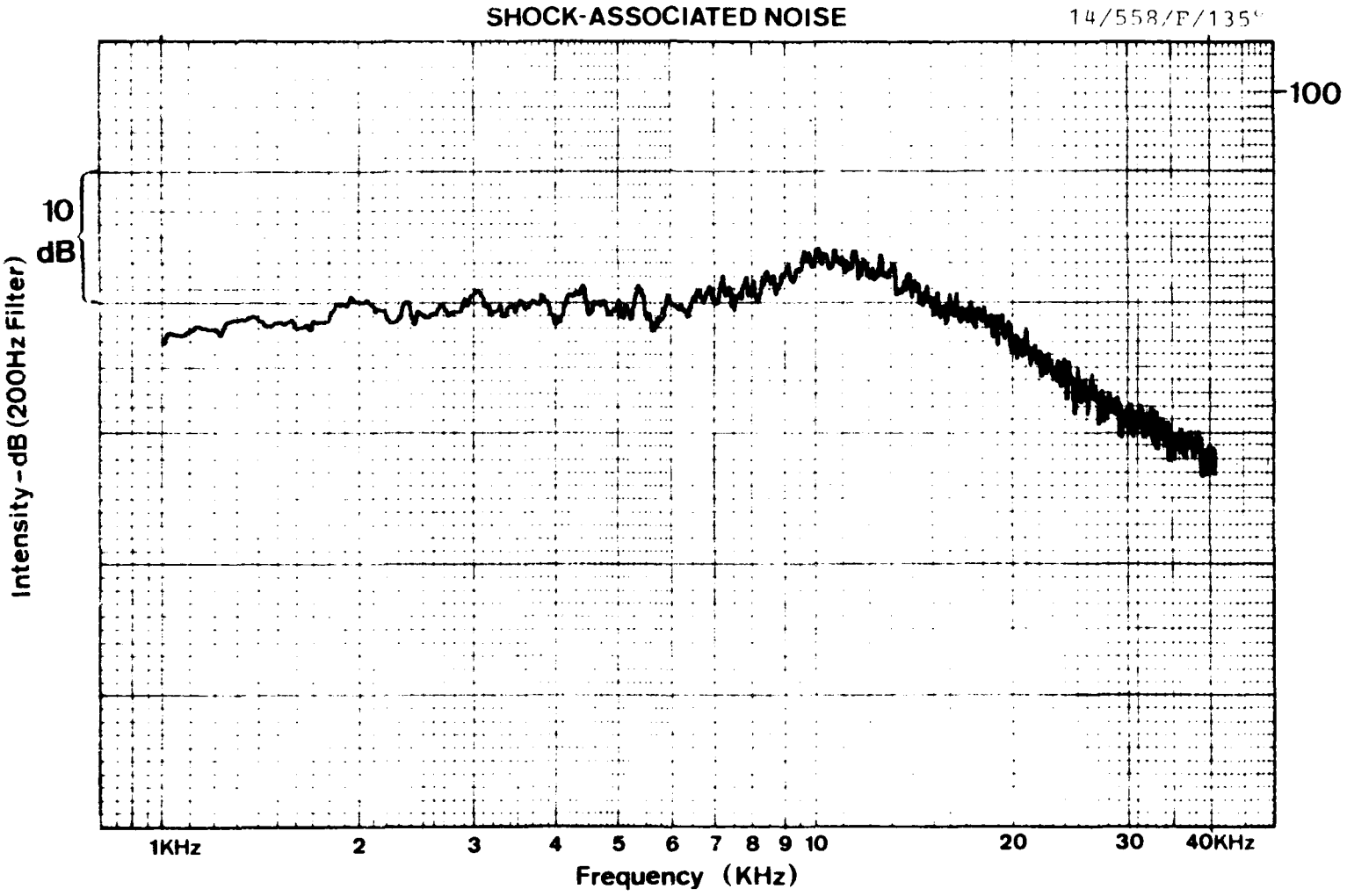
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
14/558/F/135
100
10
dB
Intensity - dB (200Hz Filter)
1KHz
2
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4
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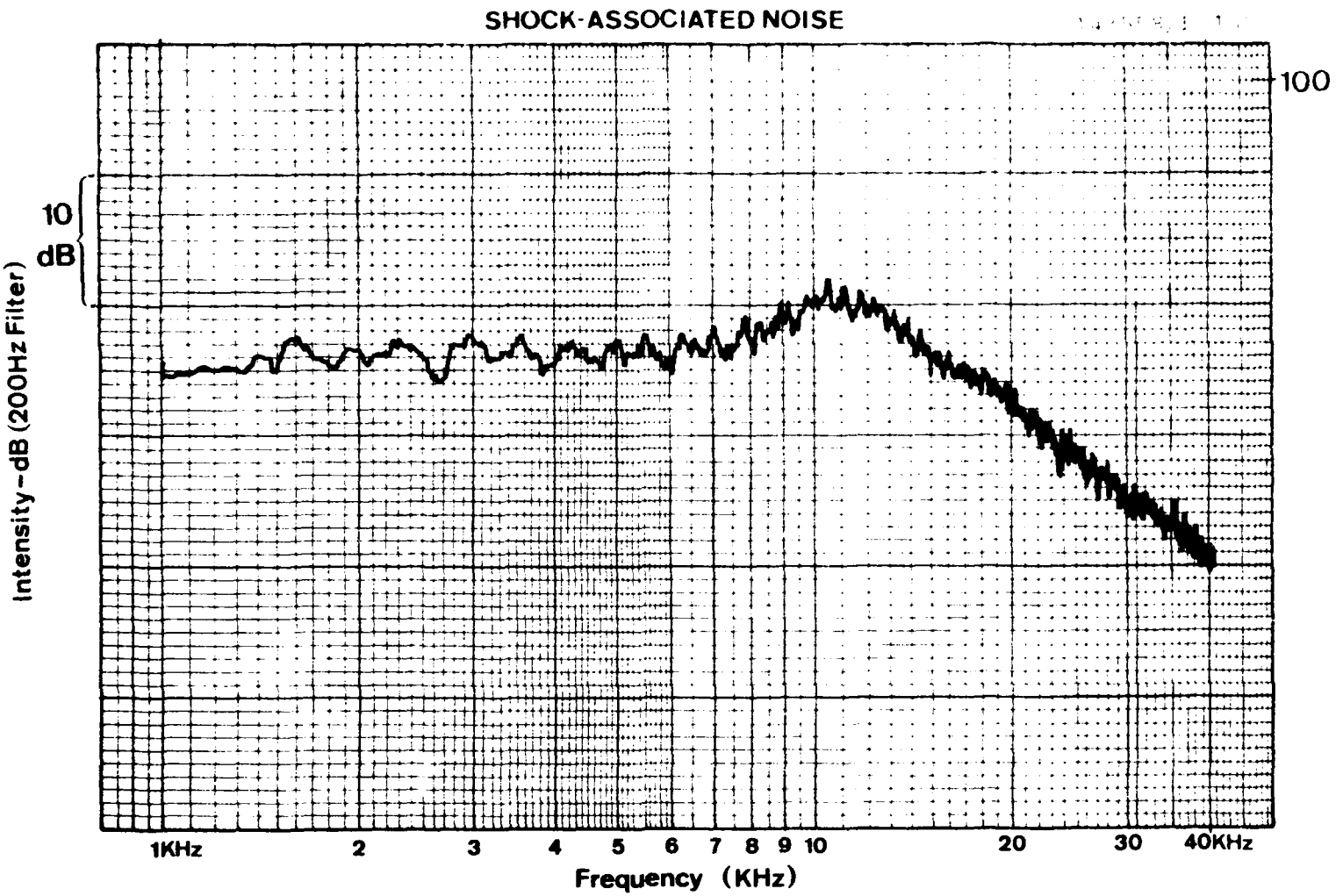
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
100
10
dB
Intensity-dB (200Hz Filter)
1KHz
2
3
4
5
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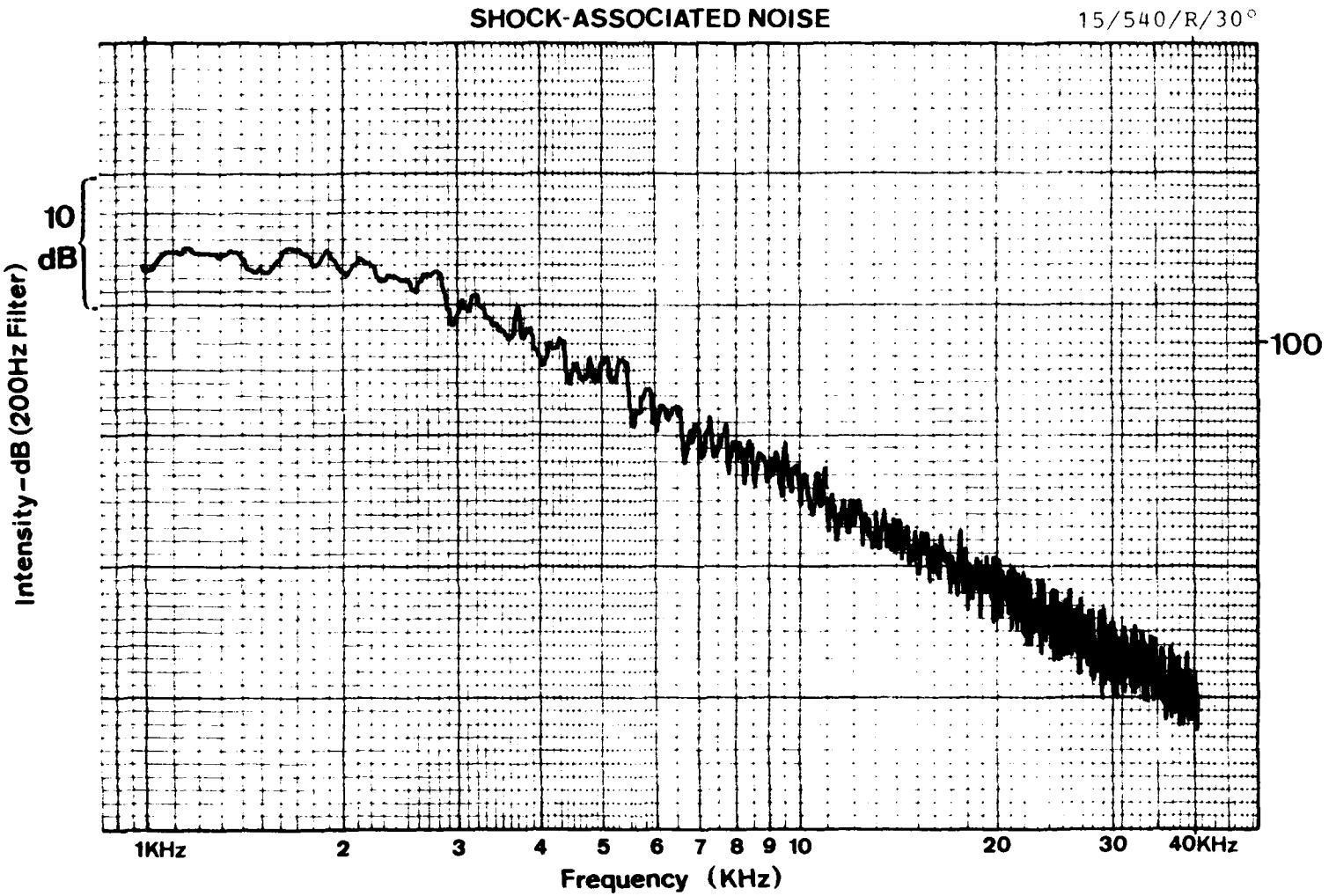
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
15/540/R/30°
10
dB
Intensity - dB (200Hz Filter)
100
1KHz
2
3
4
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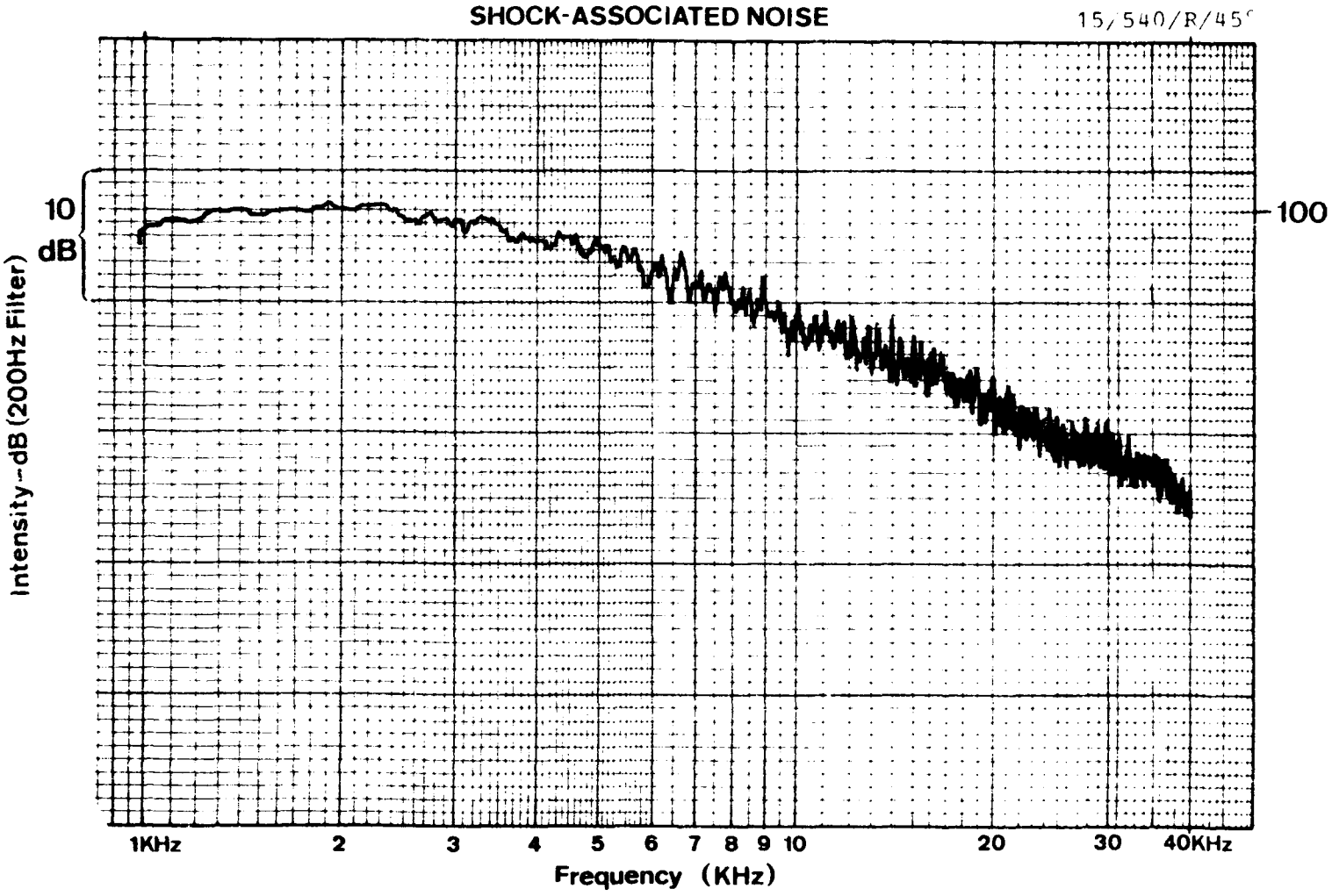
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
15/540/R/45°
10
dB
100
Intensity - dB (200Hz Filter)
1KHz
2
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4
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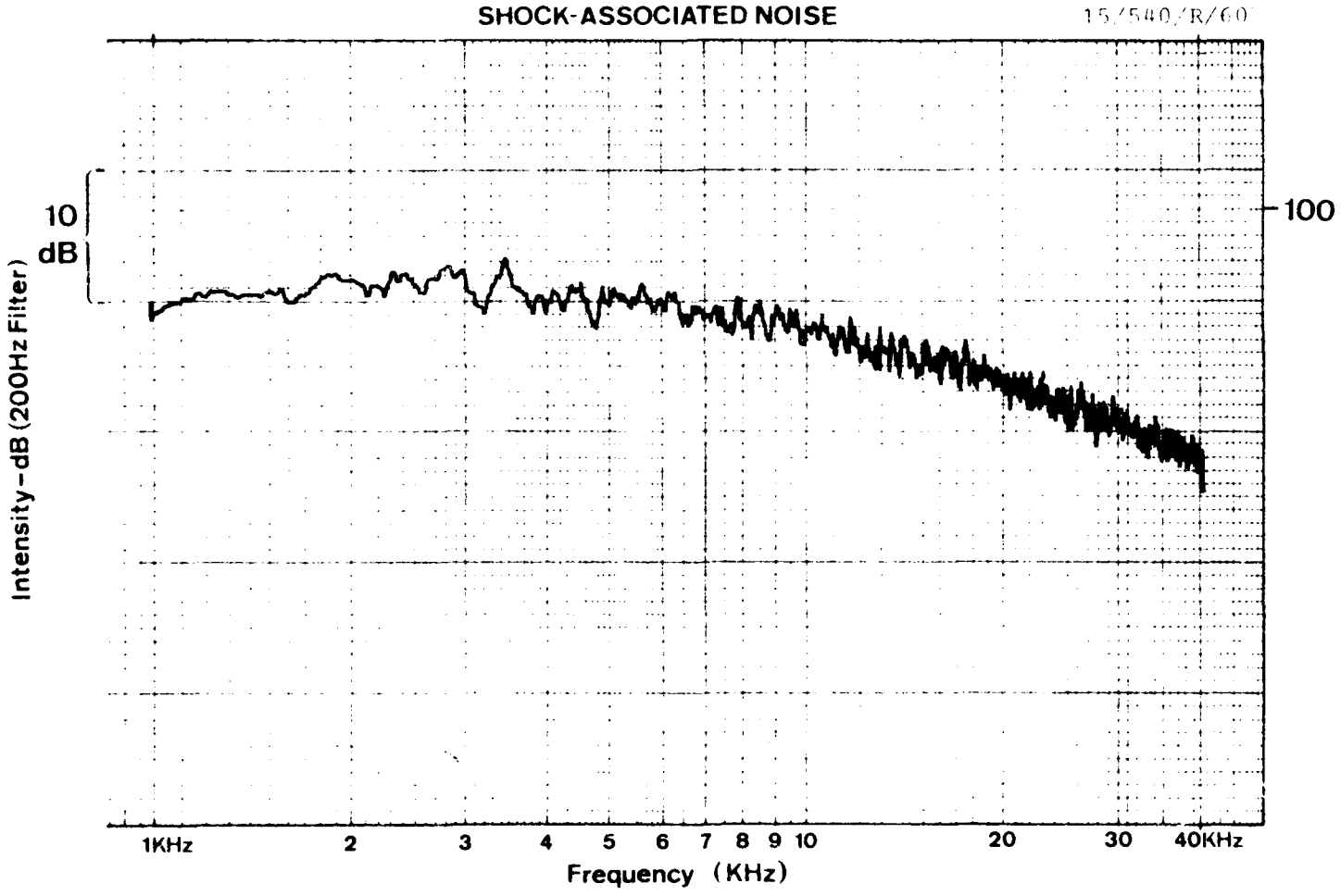
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
15/540/R/60
10
dB
100
Intensity - dB (200Hz Filter)
1KHz
2
3
4
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7
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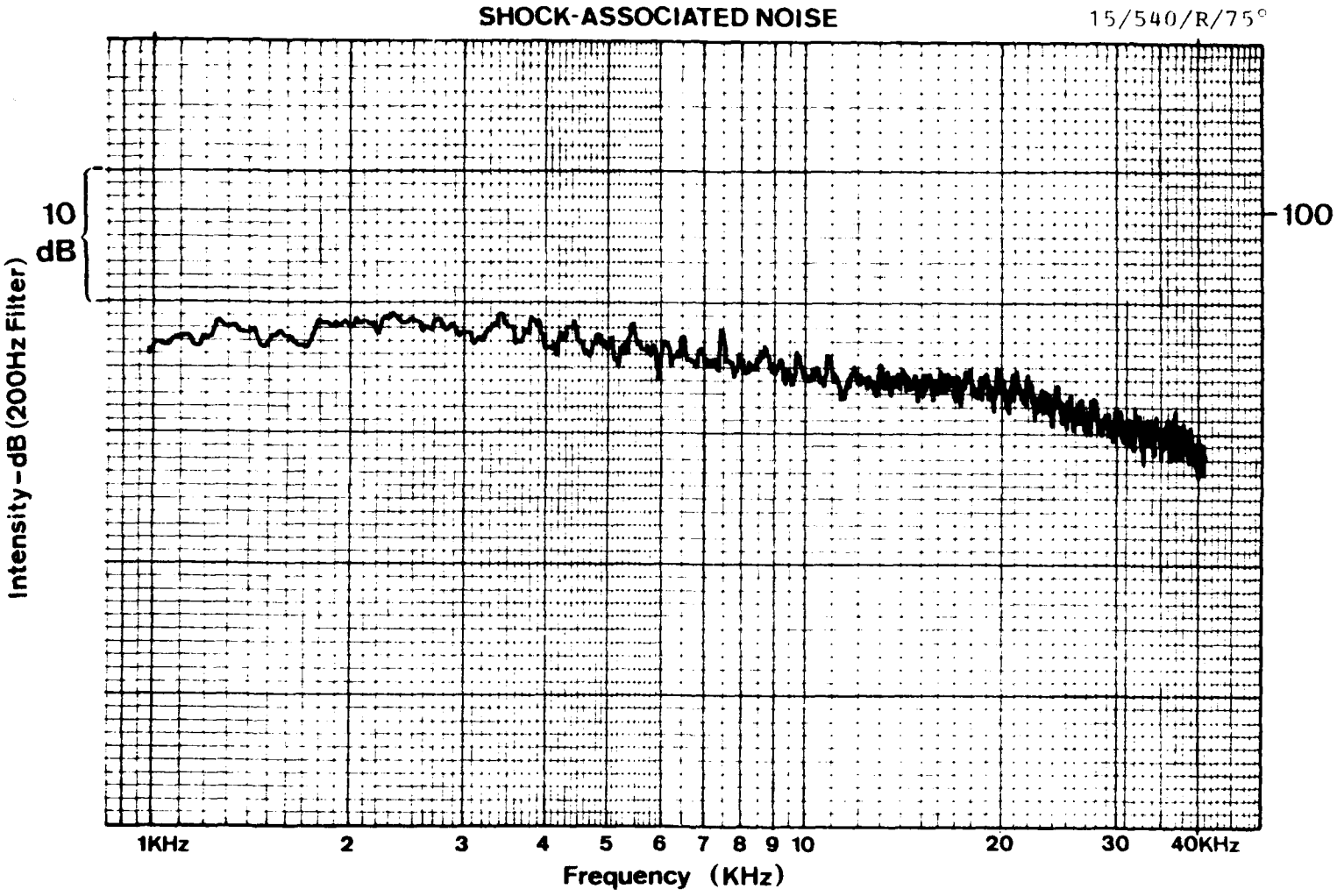
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
15/540/R/75°
10
dB
100
Intensity-dB (200Hz Filter)
1KHz
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9
10
20
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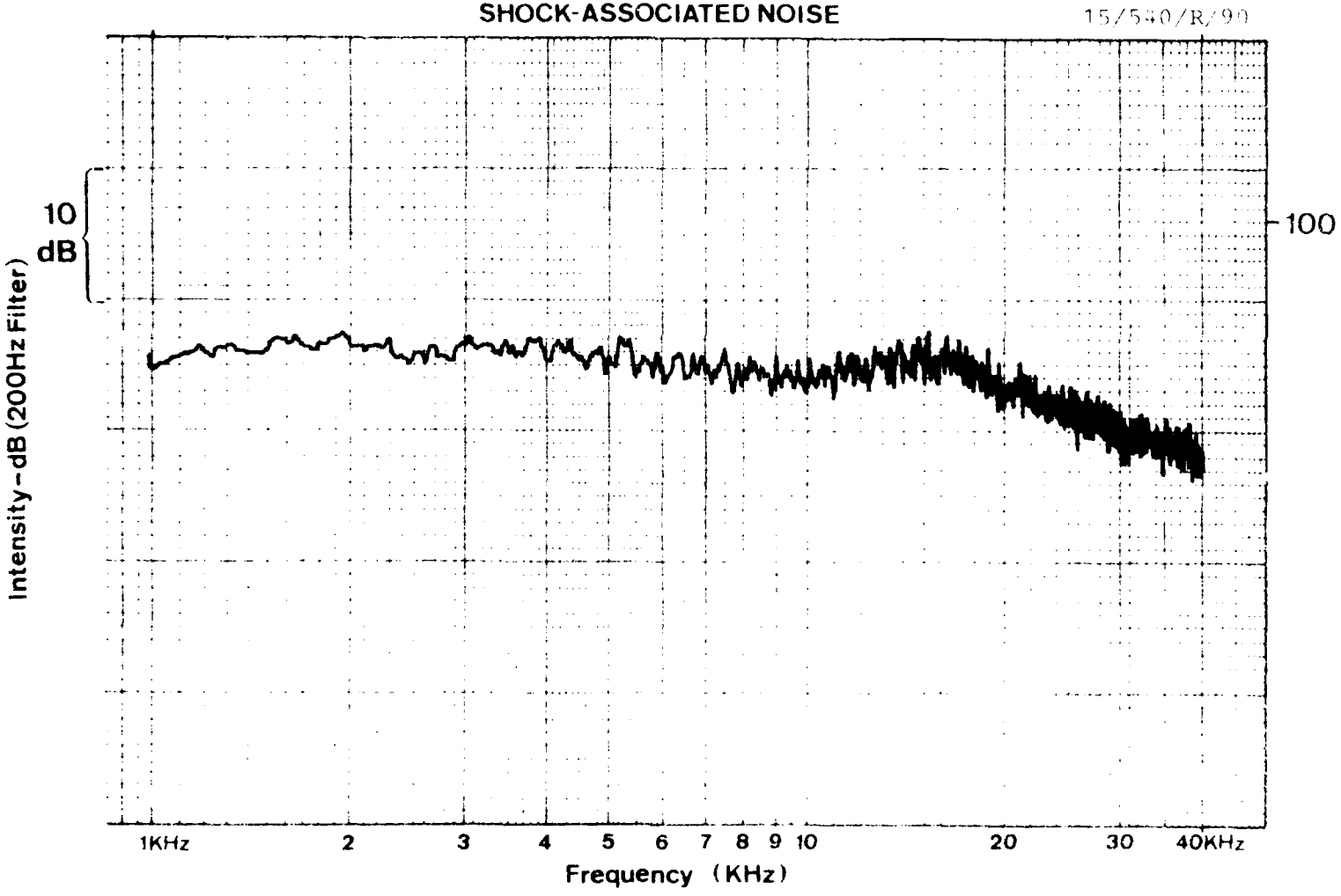
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
15/540/R/90
10
dB
100
Intensity - dB (200Hz Filter)
1KHz
2
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4
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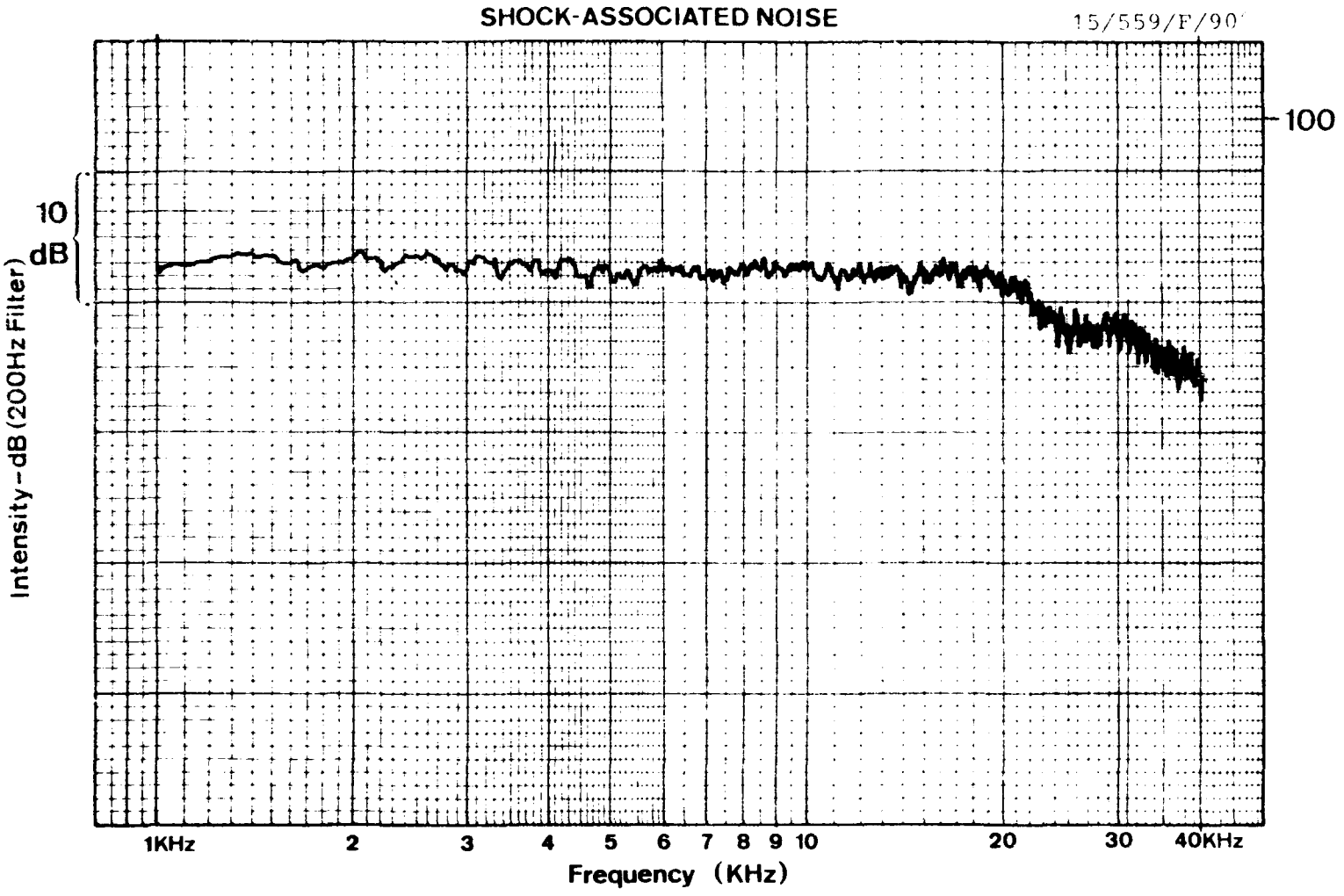
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
15/559/F/90
100
10
dB
Intensity - dB (200Hz Filter)
1KHz
2
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4
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9
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20
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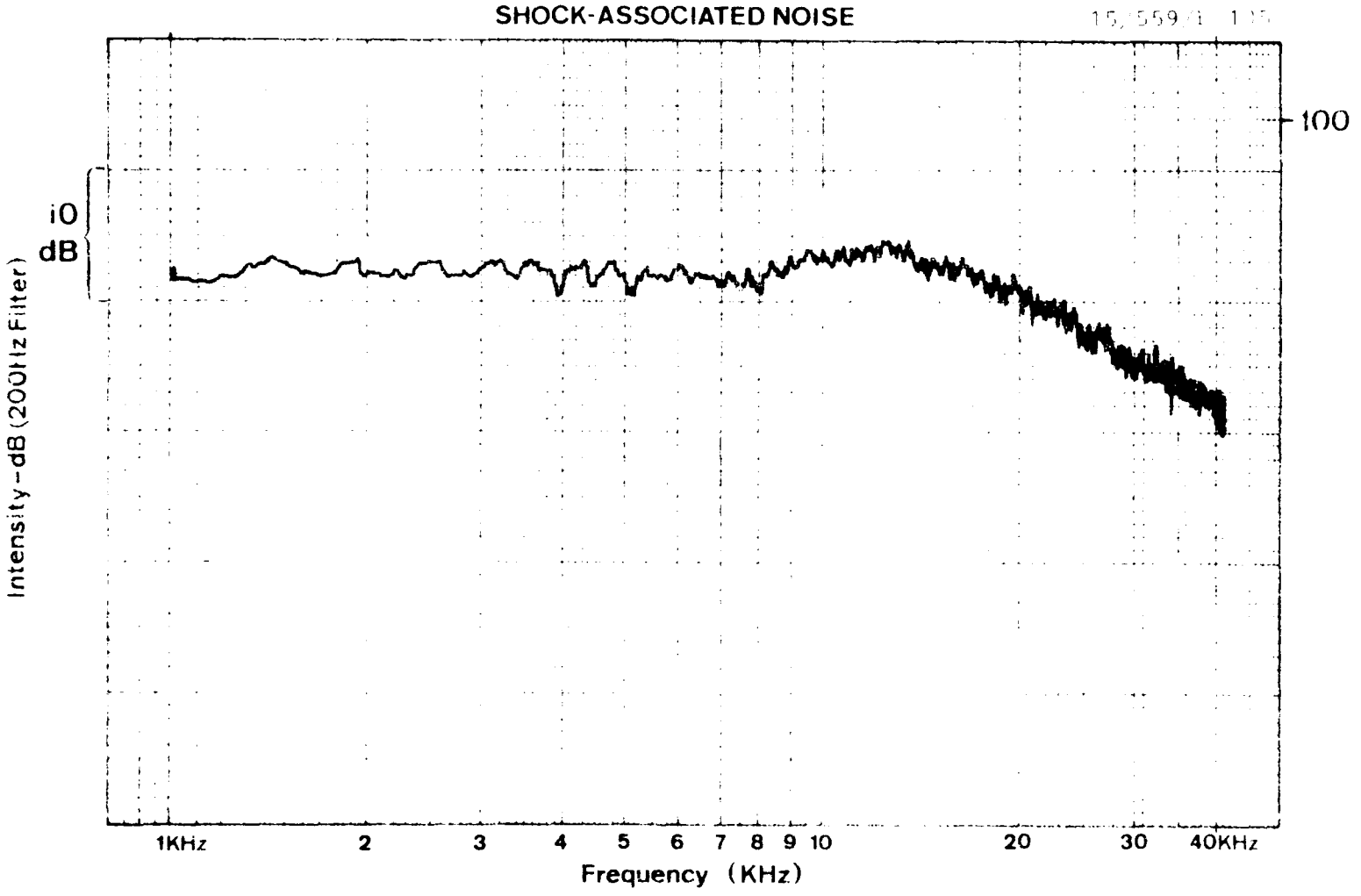
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
100
10
dB
Intensity - dB (200Hz Filter)
1KHz
2
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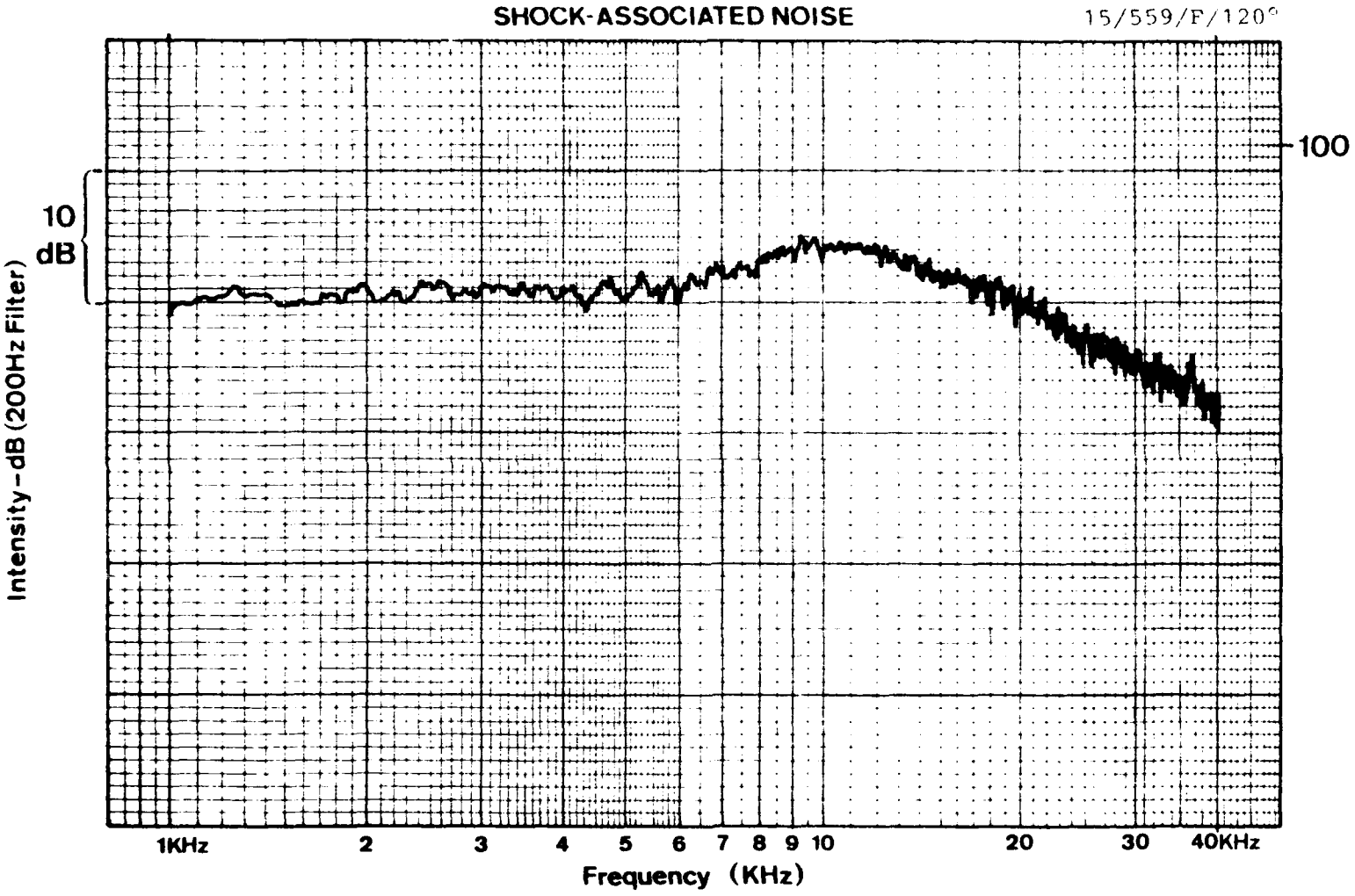
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
15/559/F/120°
100
10
dB
Intensity-dB (200Hz Filter)
1KHz
2
3
4
5
6
7
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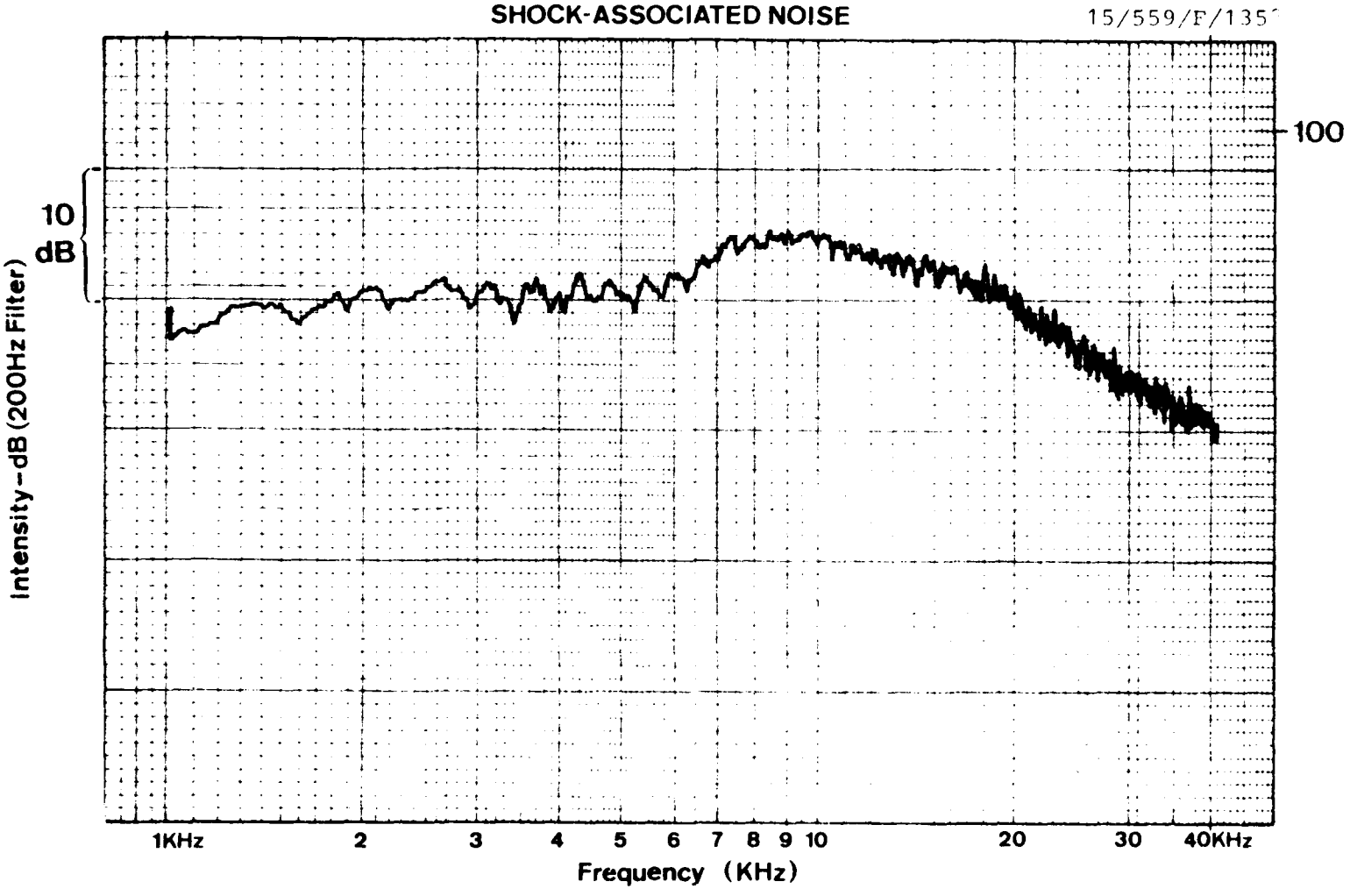
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
15/559/F/135
100
10
dB
Intensity-dB (200Hz Filter)
1KHz
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20
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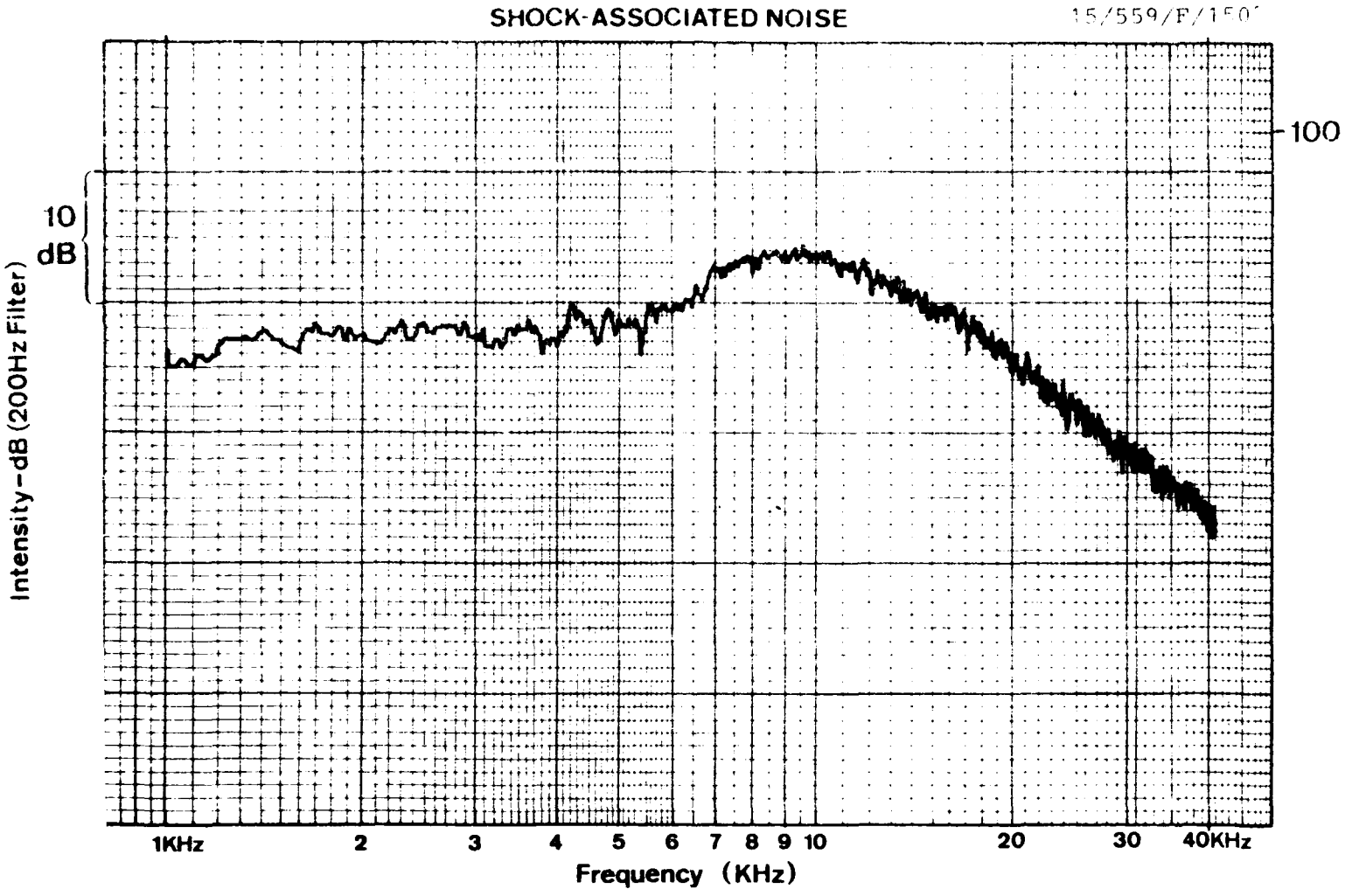
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
15/559/F/150
100
10
dB
Intensity - dB (200Hz Filter)
1KHz
2
3
4
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9
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20
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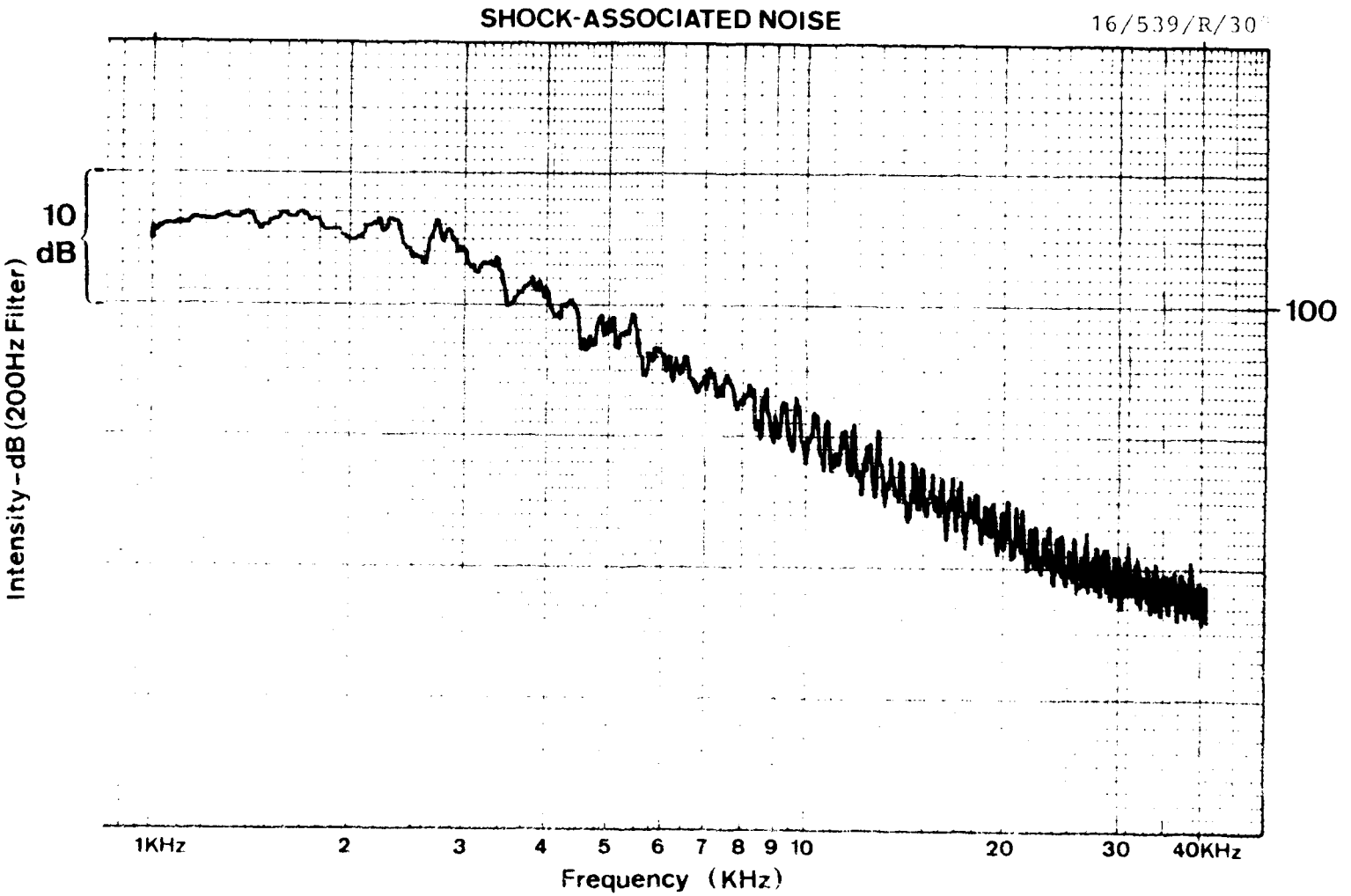
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
16/539/R/30
10
dB
Intensity - dB (200Hz Filter)
100
1KHz
2
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20
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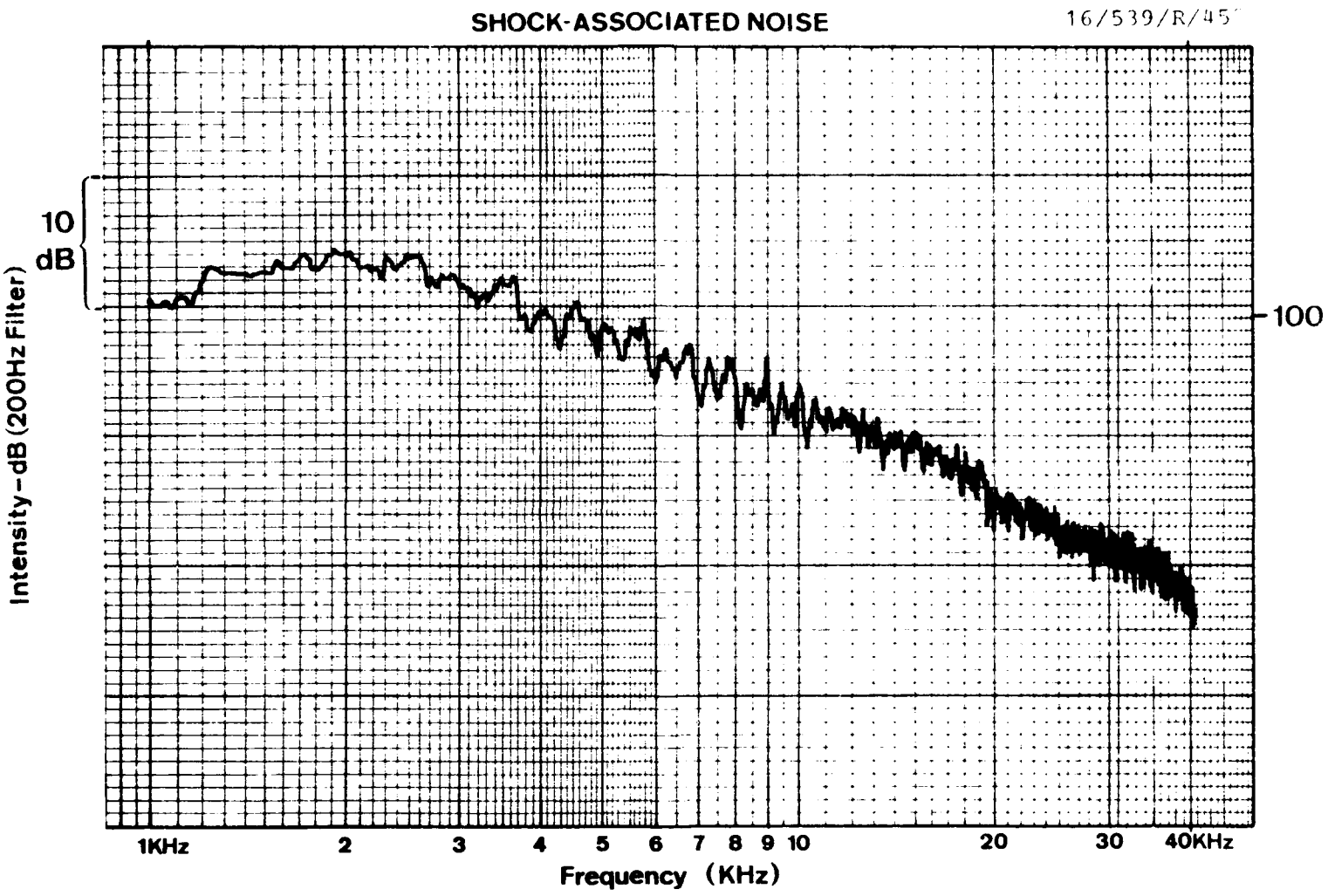
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
16/539/R/45
10
dB
Intensity - dB (200Hz Filter)
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1KHz
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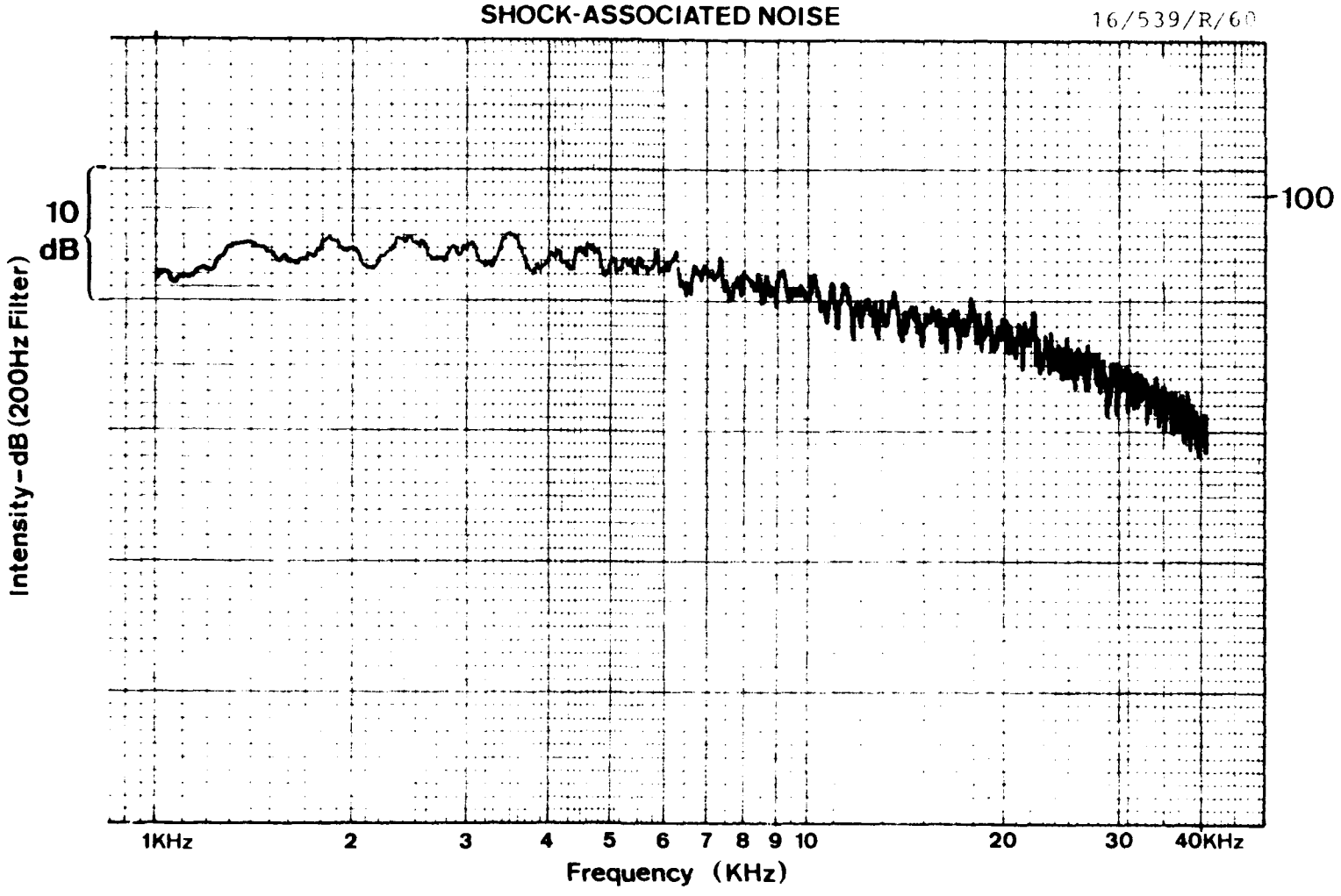
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
16/539/R/60
10
dB
100
Intensity-dB (200Hz Filter)
1KHz
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10
20
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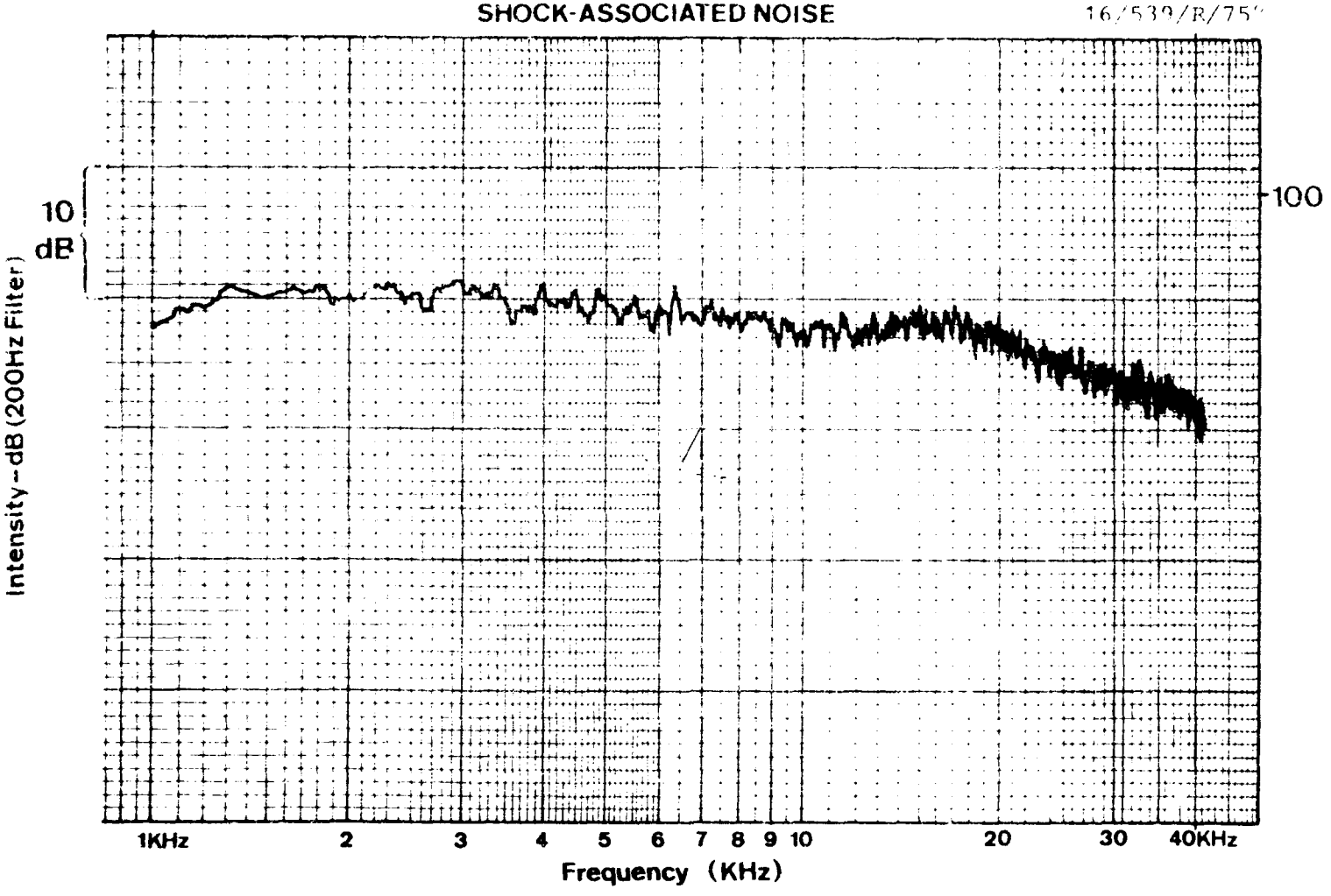
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
16/539/R/75
10
dB
100
Intensity - dB (200Hz Filter)
1KHz
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20
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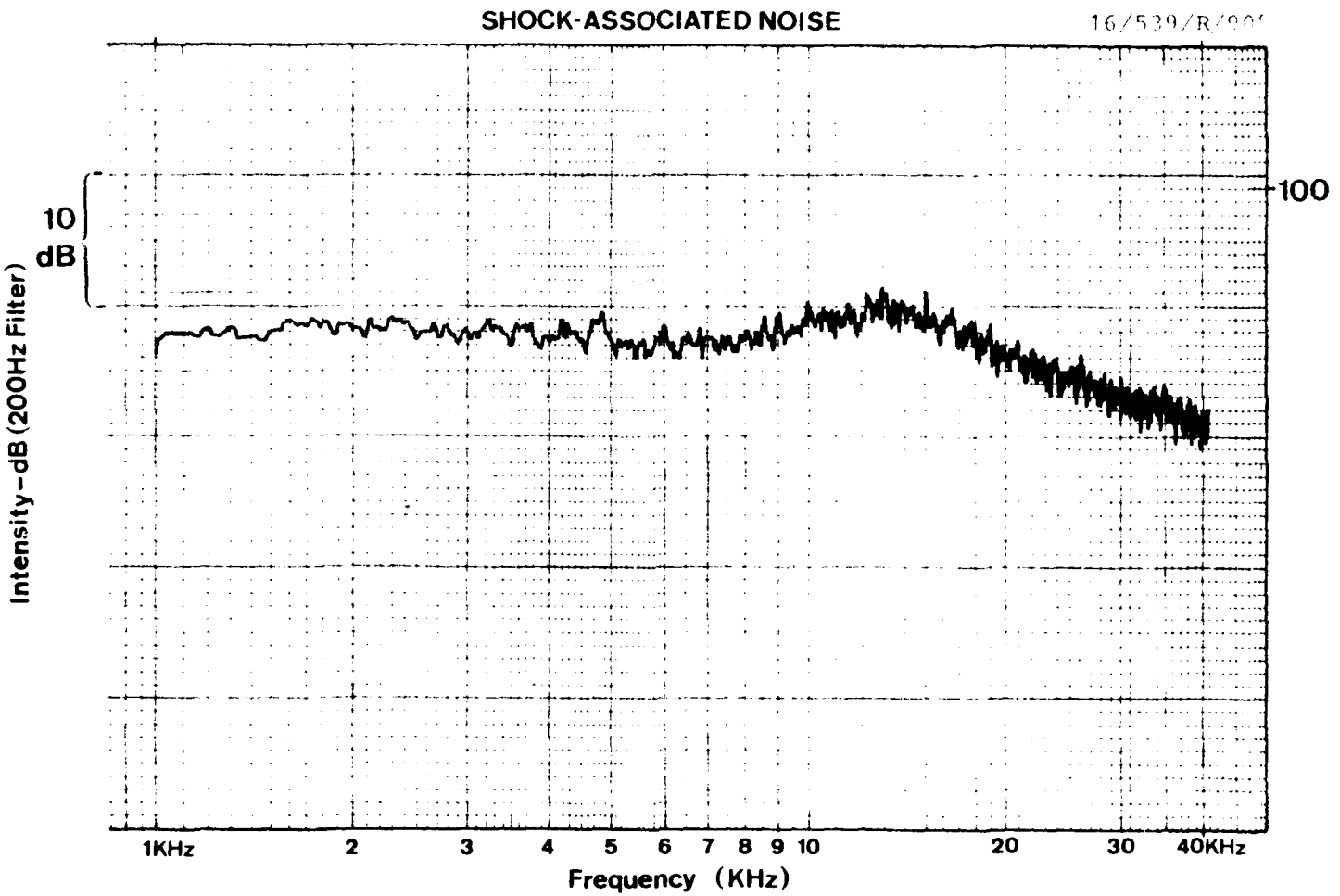
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
16/539/R/00
10
dB
100
Intensity - dB (200Hz Filter)
1KHz
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4
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9
10
20
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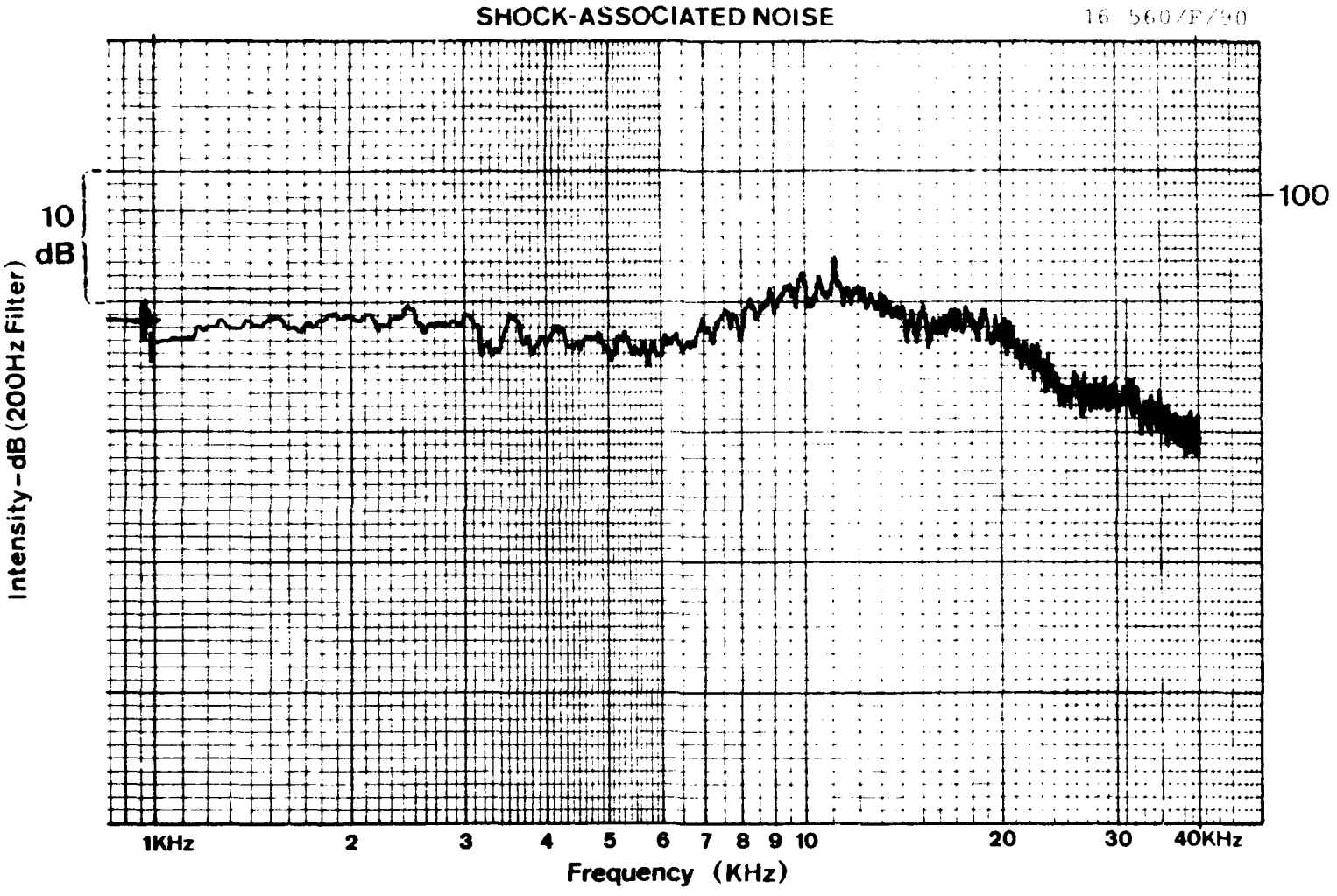
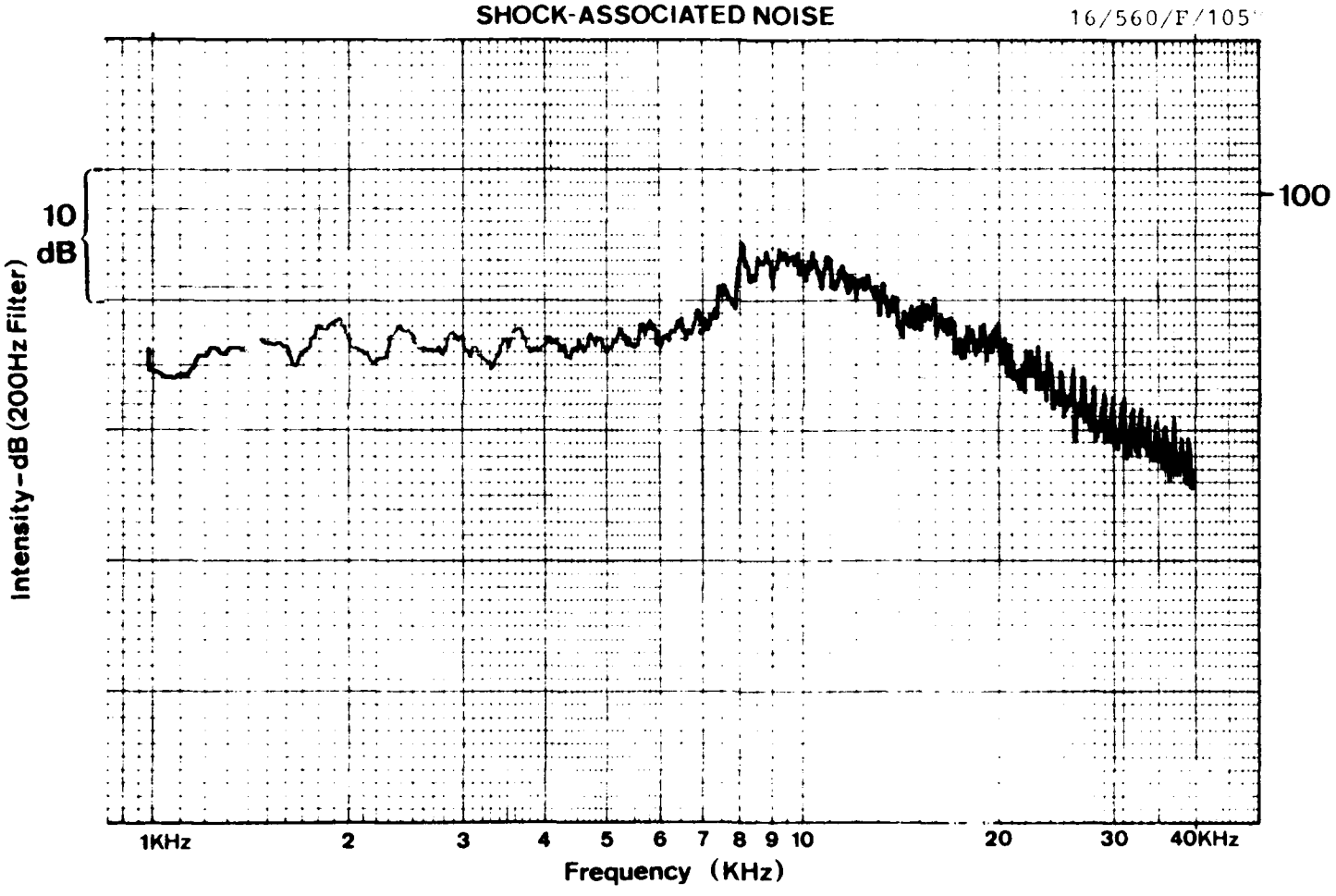
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
16 560/F/90
10
dB
100
Intensity-dB (200Hz Filter)
1KHz
2
3
4
5
6
7
8
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
16/560/F/105
10
dB
100
Intensity - dB (200Hz Filter)
1KHz
2
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9
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20
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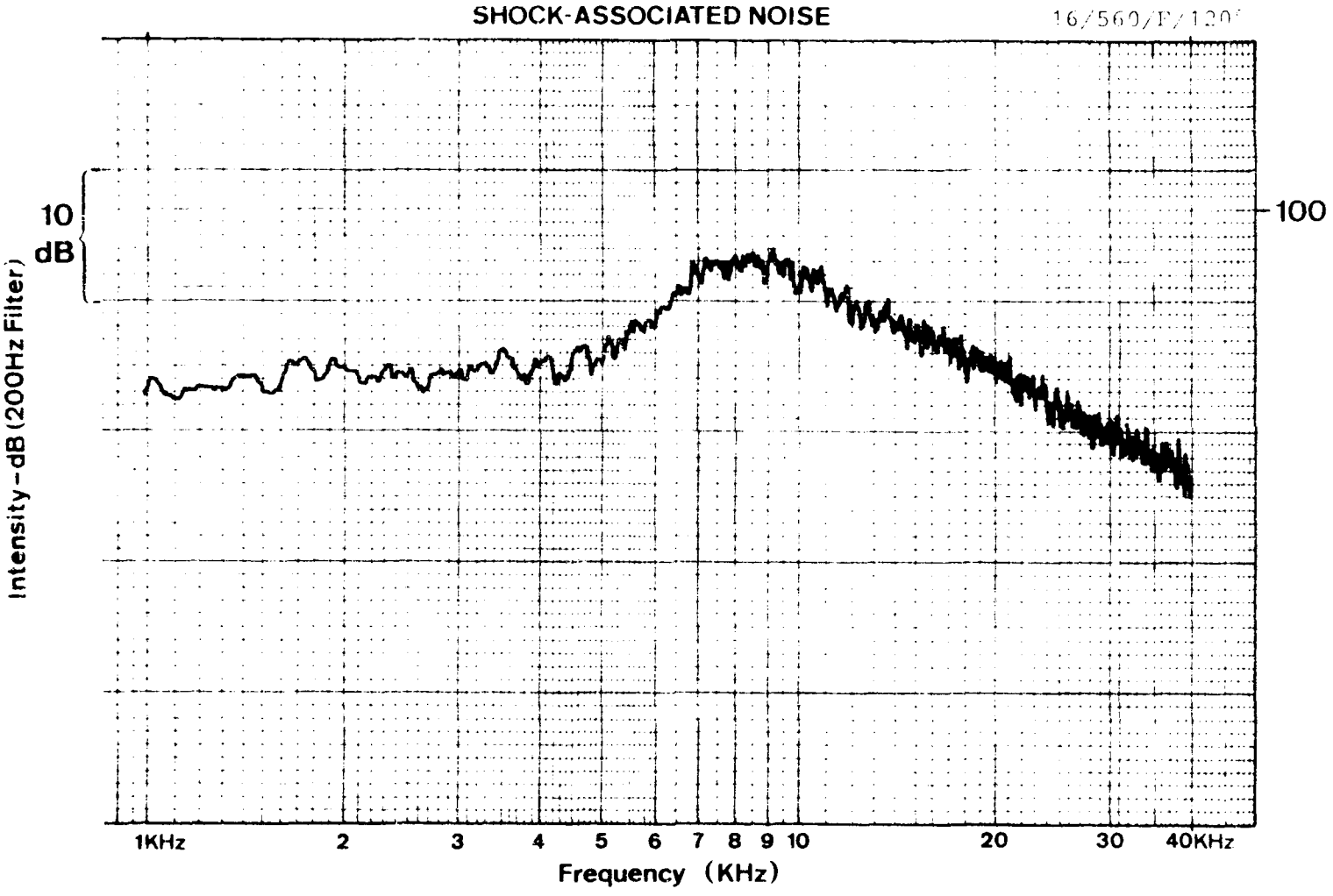
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
16/560/F/120
10
dB
100
Intensity - dB (200Hz Filter)
1KHz
2
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4
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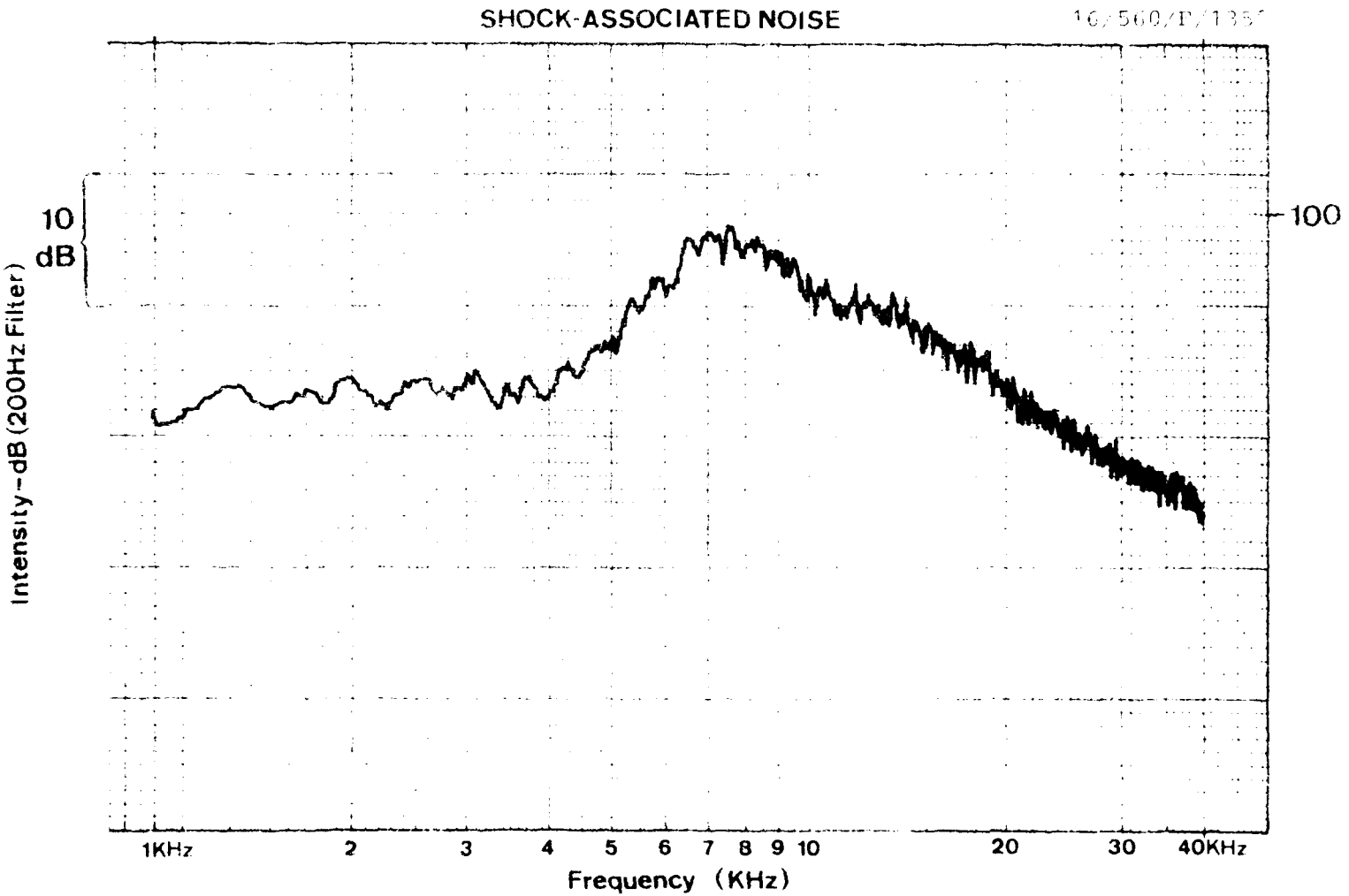
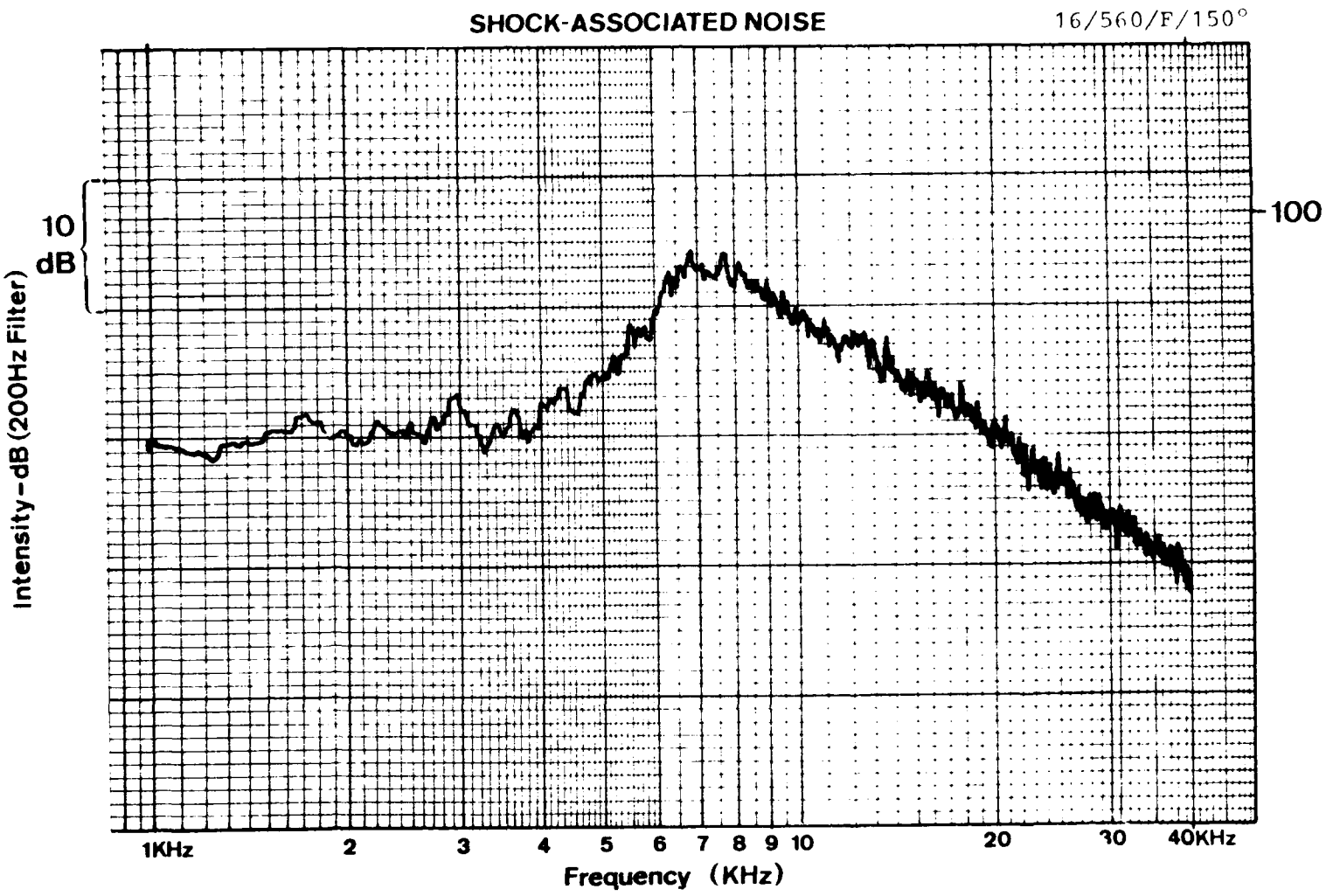
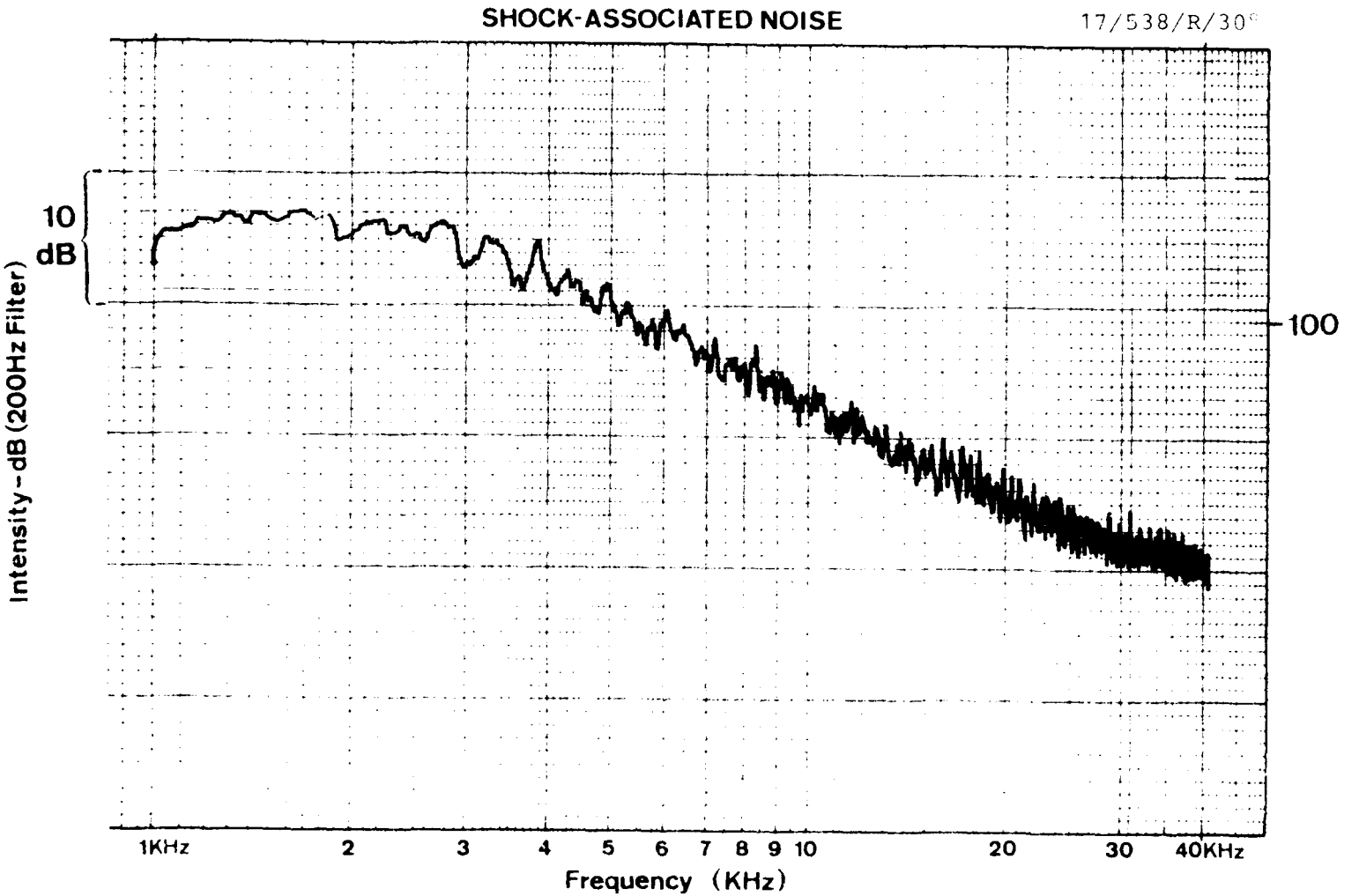
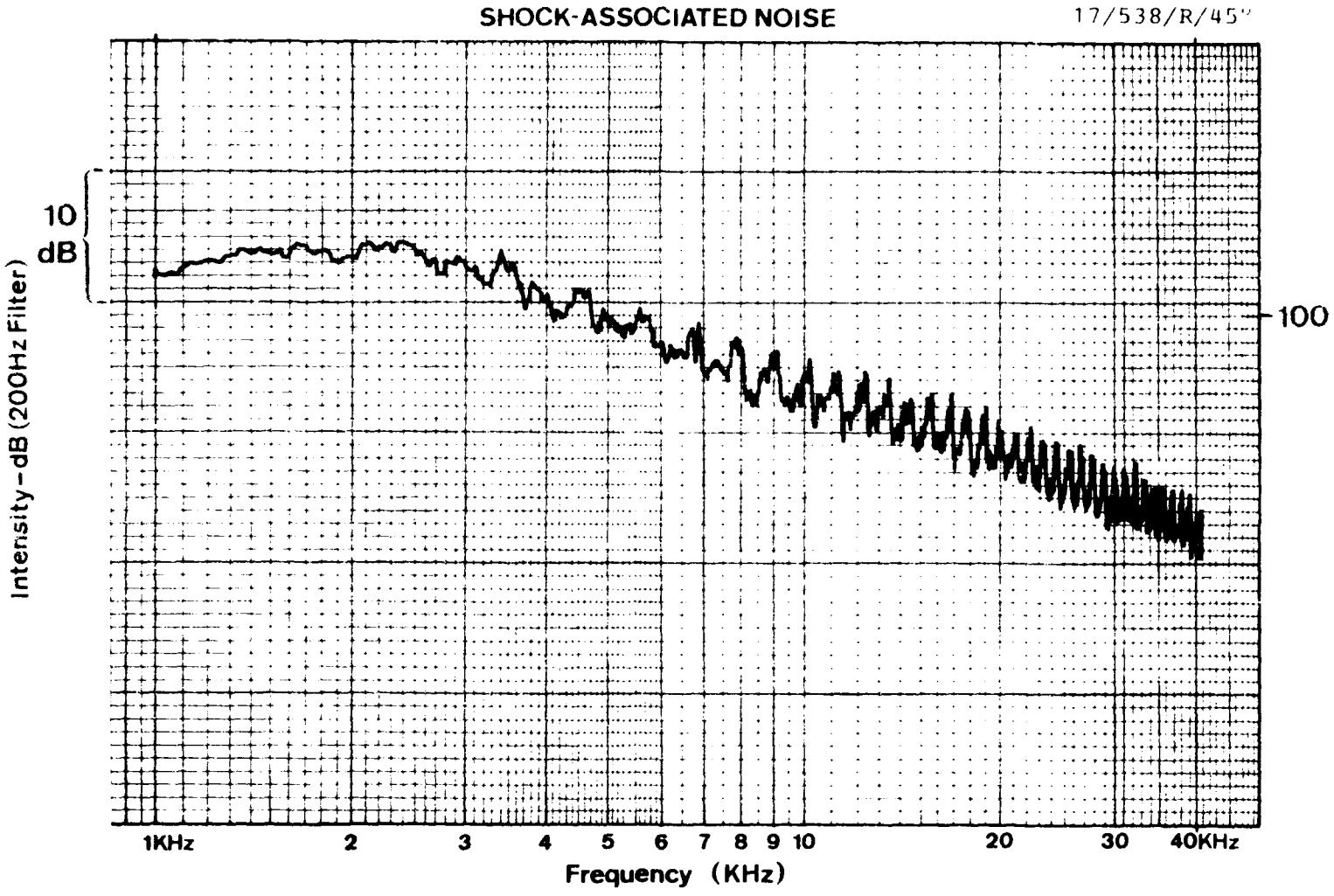
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
10
dB
100
Intensity-dB (200Hz Filter)
1KHz
2
3
4
5
6
7
8
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
16/560/F/150°
10
dB
100
Intensity - dB (200Hz Filter)
1KHz
2
3
4
5
6
7
8
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
17/538/R/30°
10
dB
Intensity - dB (200Hz Filter)
100
1KHz
2
3
4
5
6
7
8
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
17/538/R/45
10
dB
Intensity - dB (200Hz Filter)
100
1KHz
2
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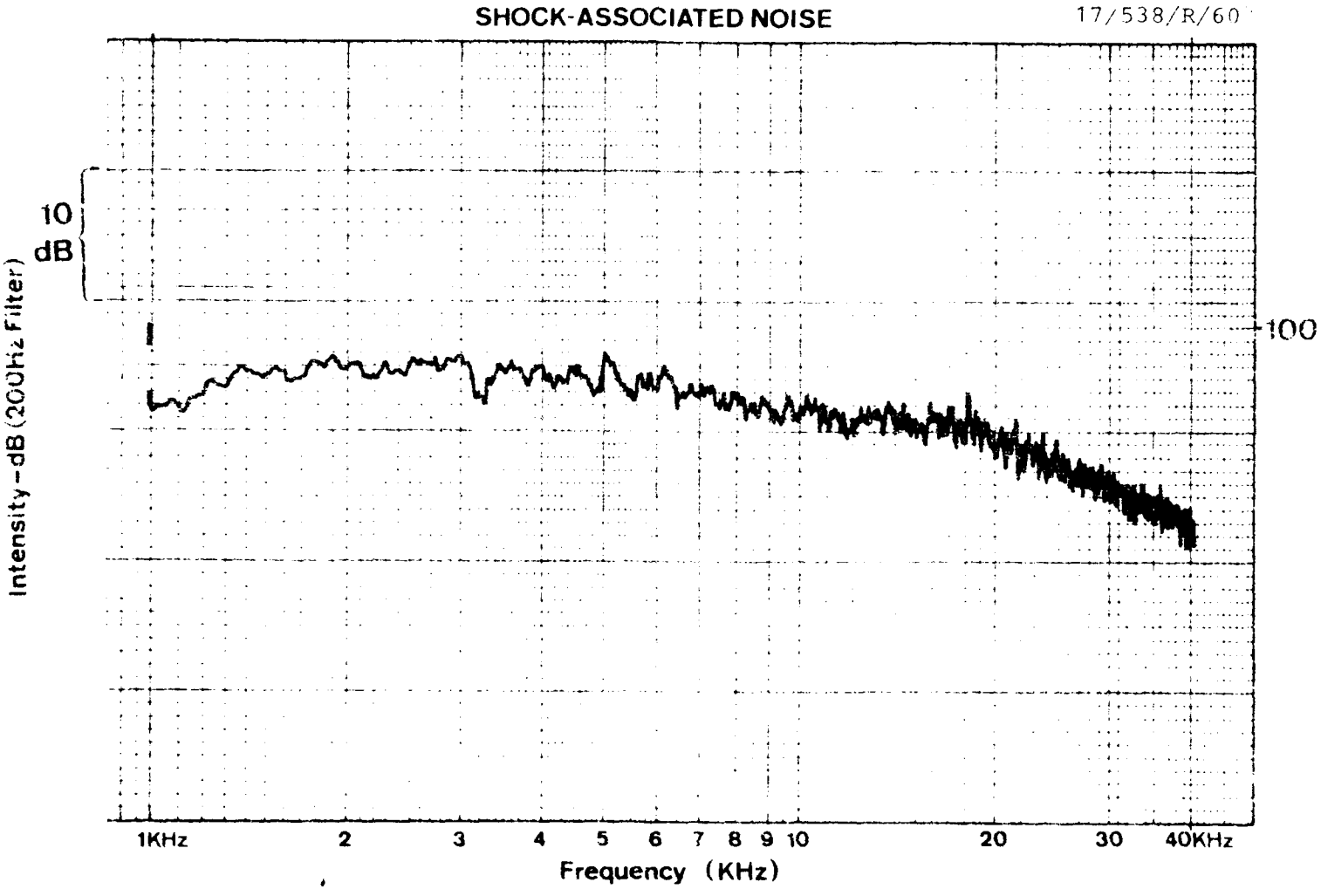
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
17/538/R/60
10
dB
Intensity - dB (200Hz Filter)
100
1KHz
2
3
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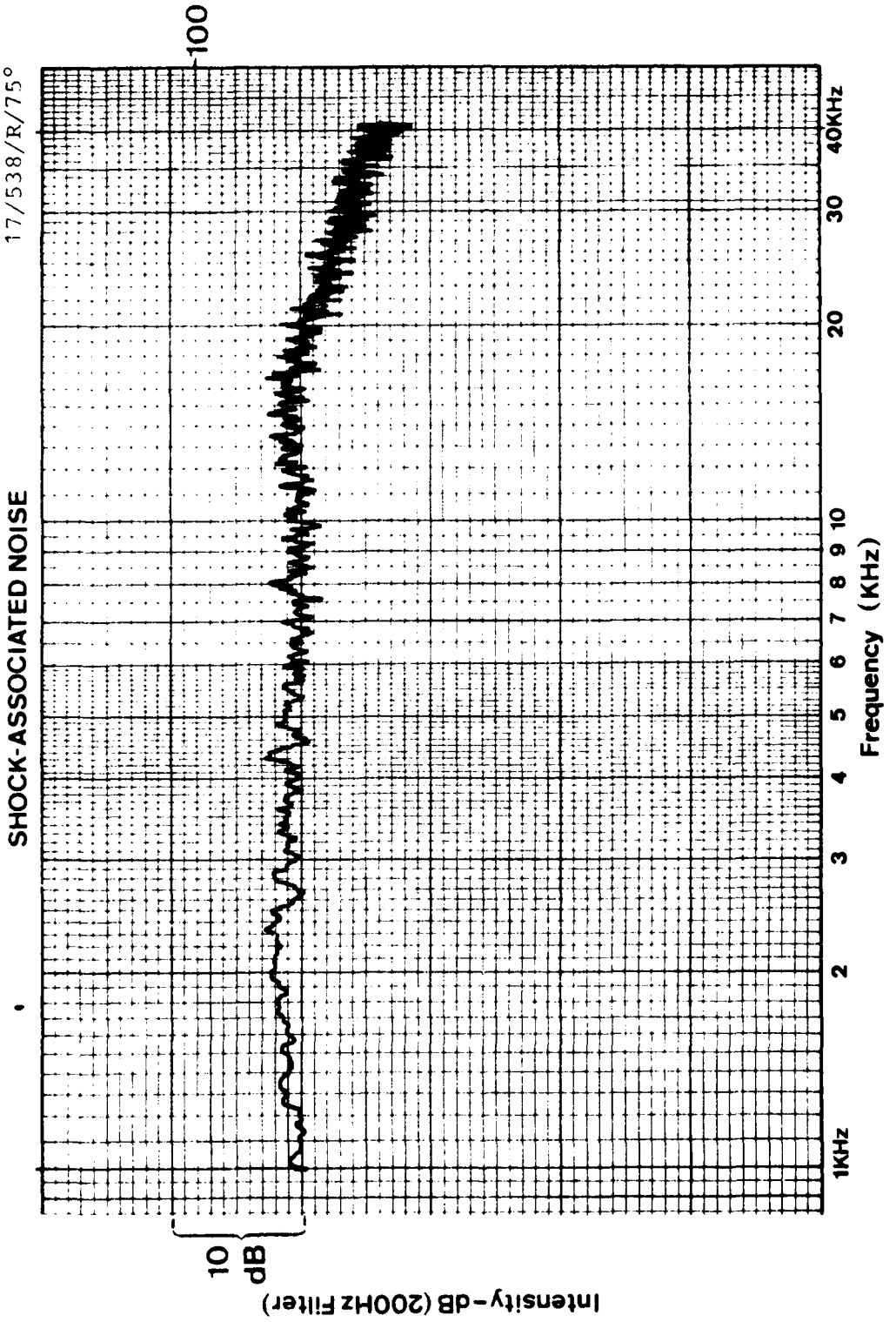
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
17/538/R/75°
100
10 dB
Intensity – dB (200Hz Filter)
1KHz
2
3
4
5
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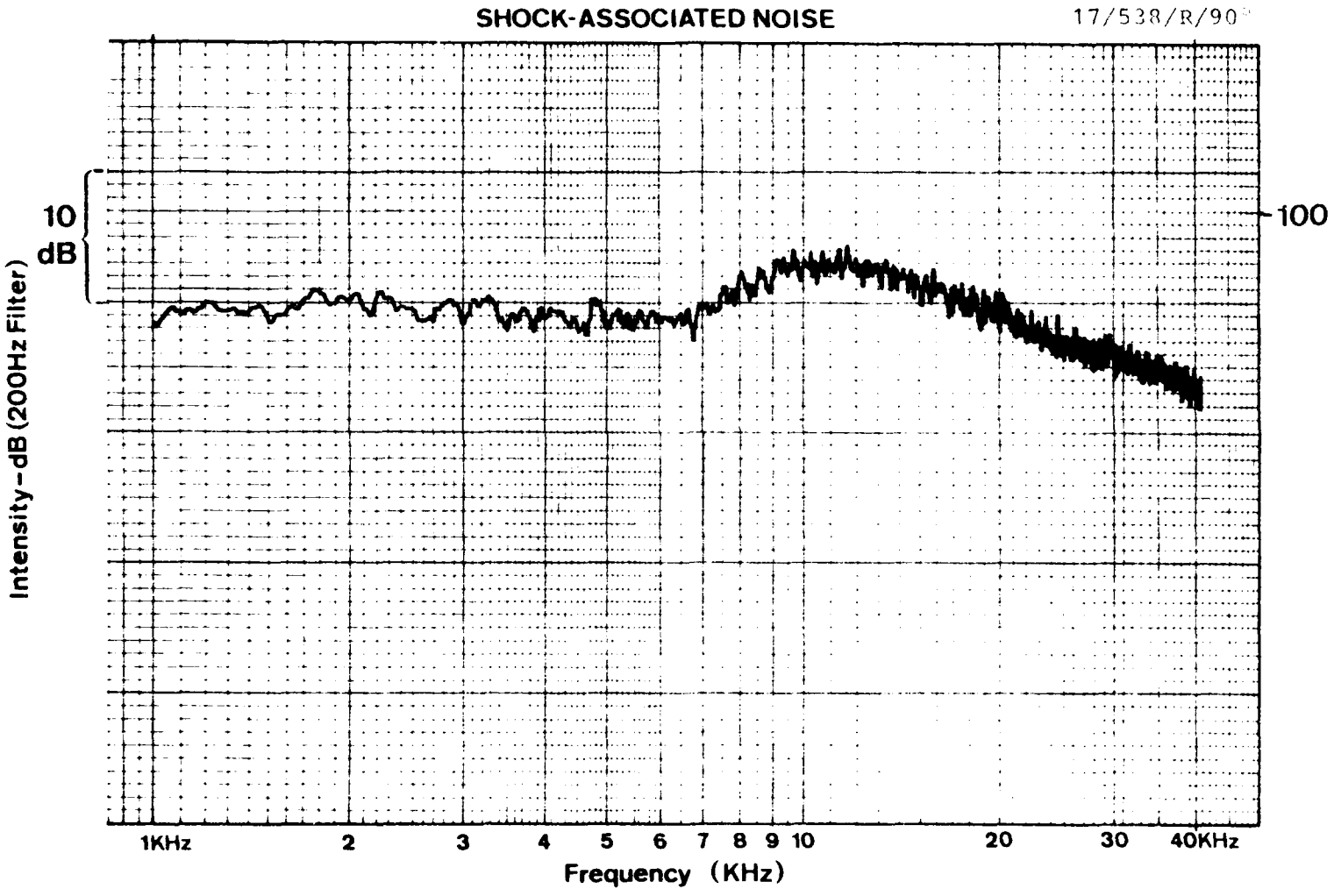
7
8
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
17/538/R/90
10
dB
100
Intensity - dB (200Hz Filter)
1KHz
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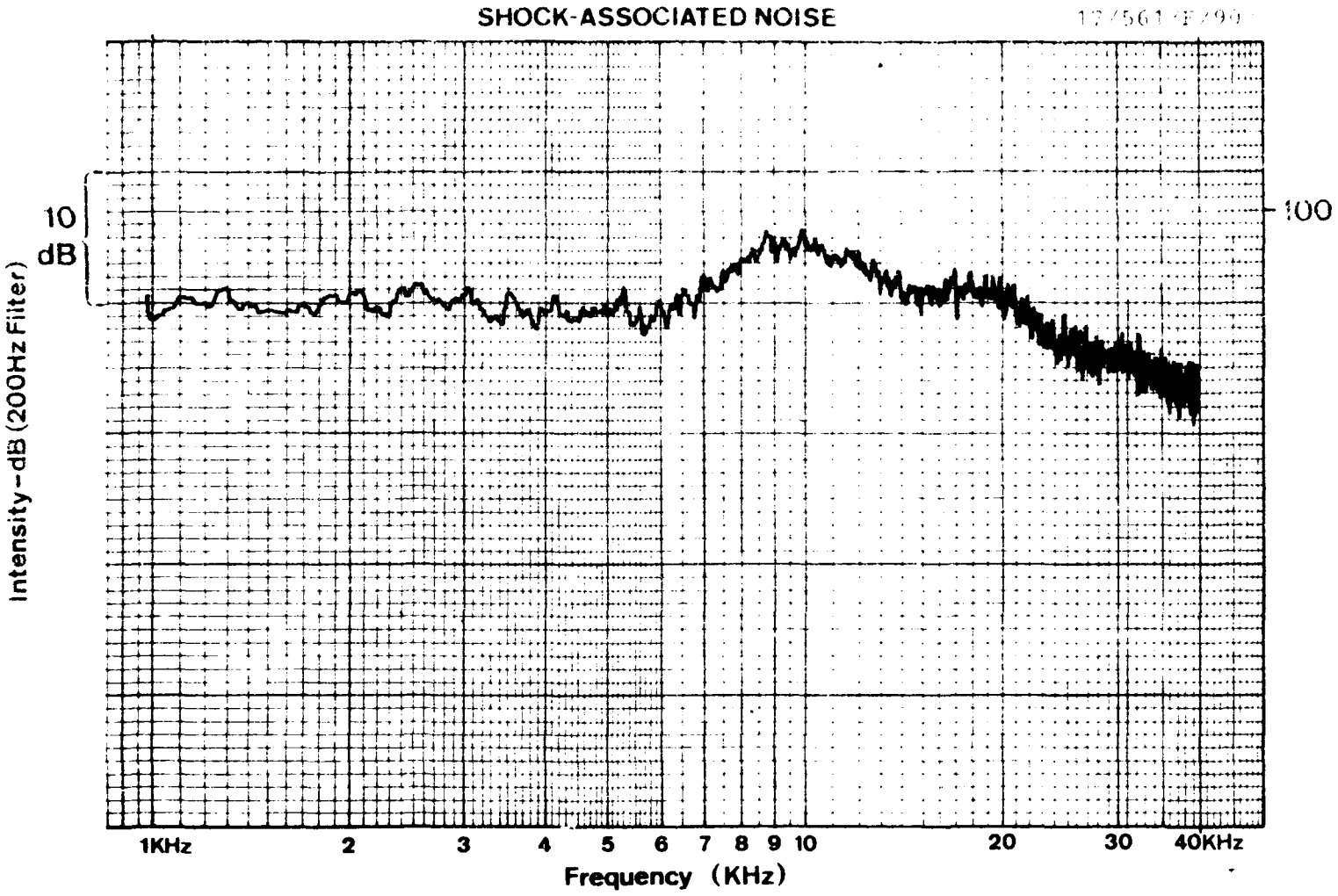
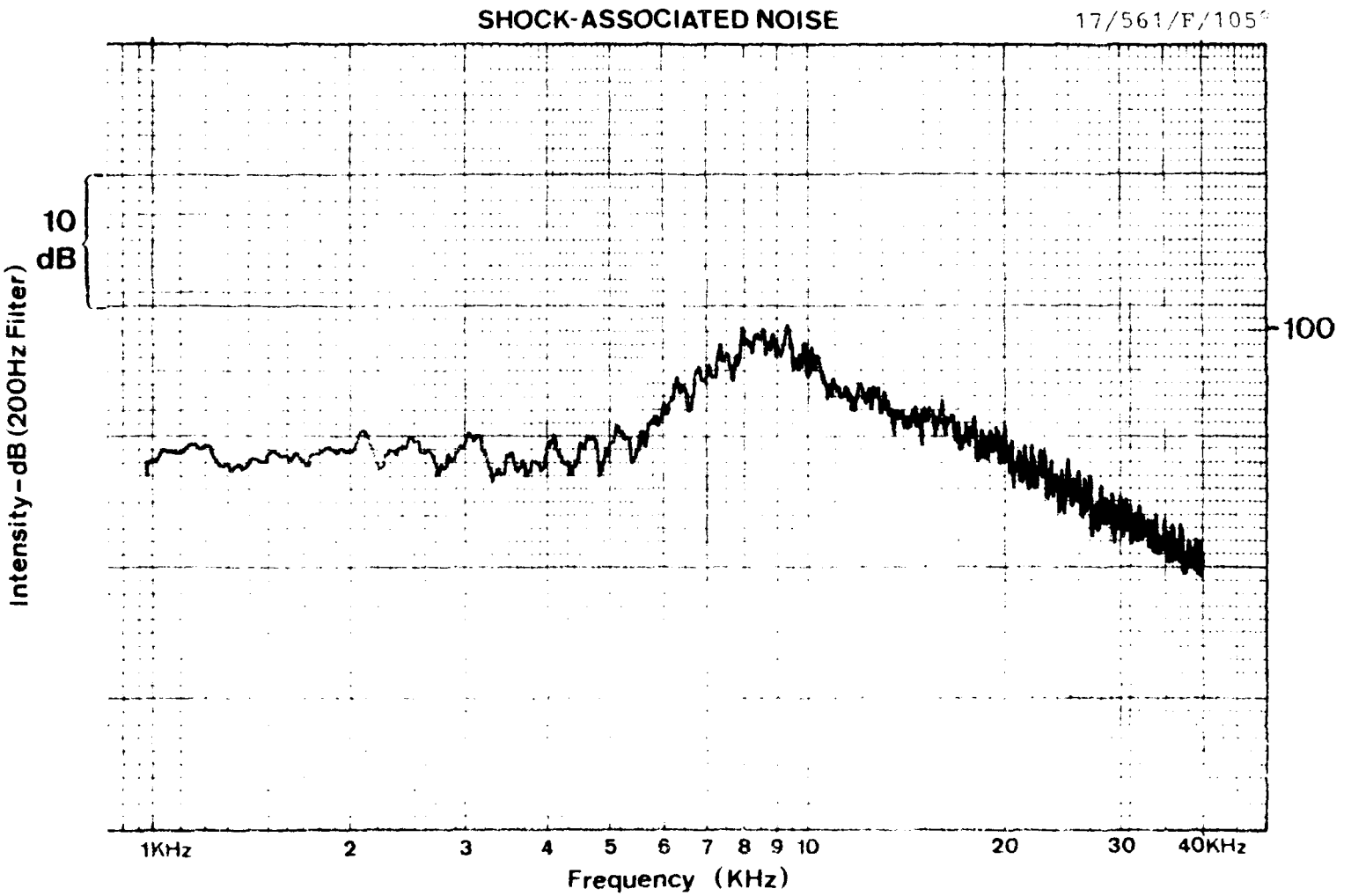
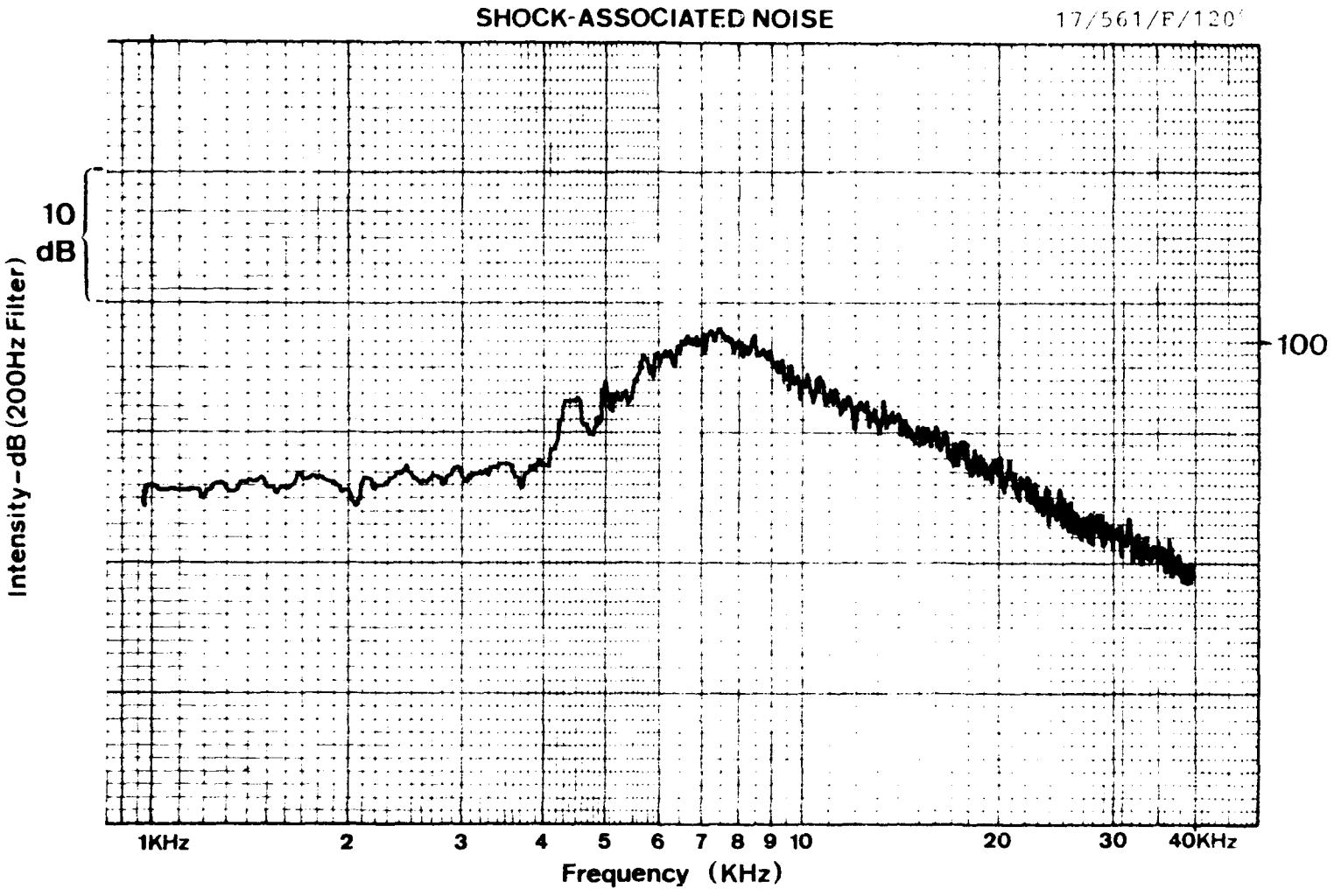
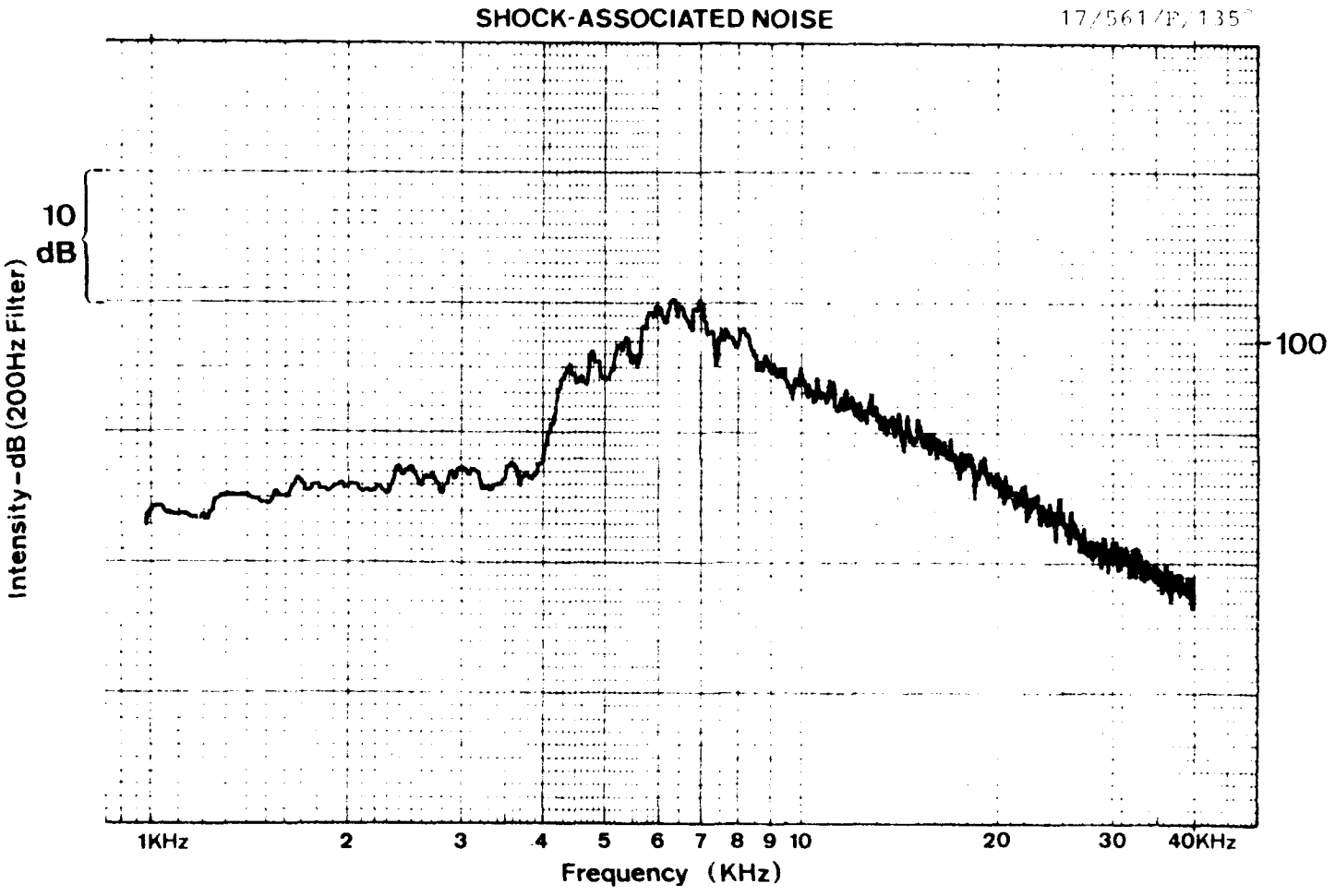
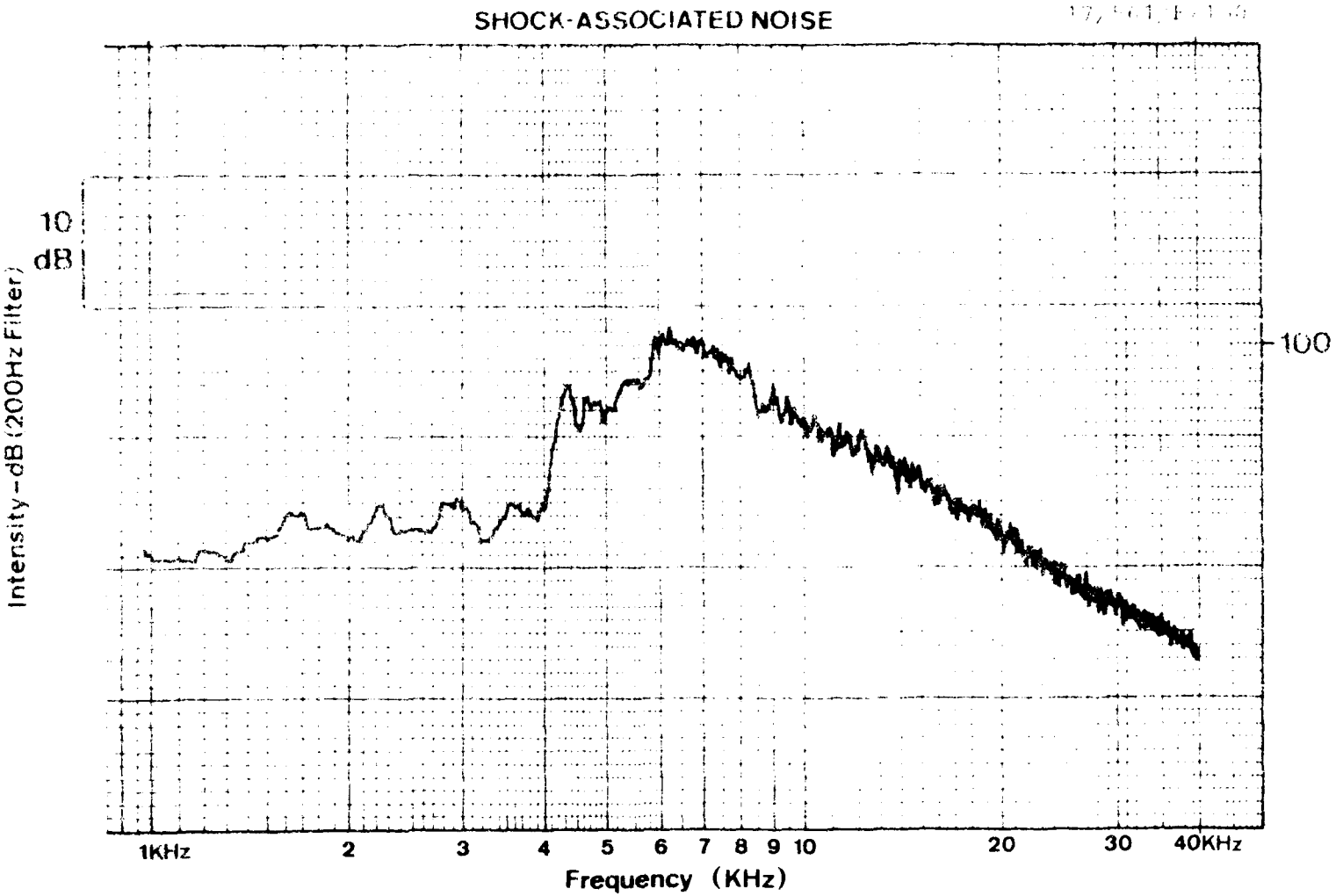
9
10
20
30
40KHz
Frequency (KHz)

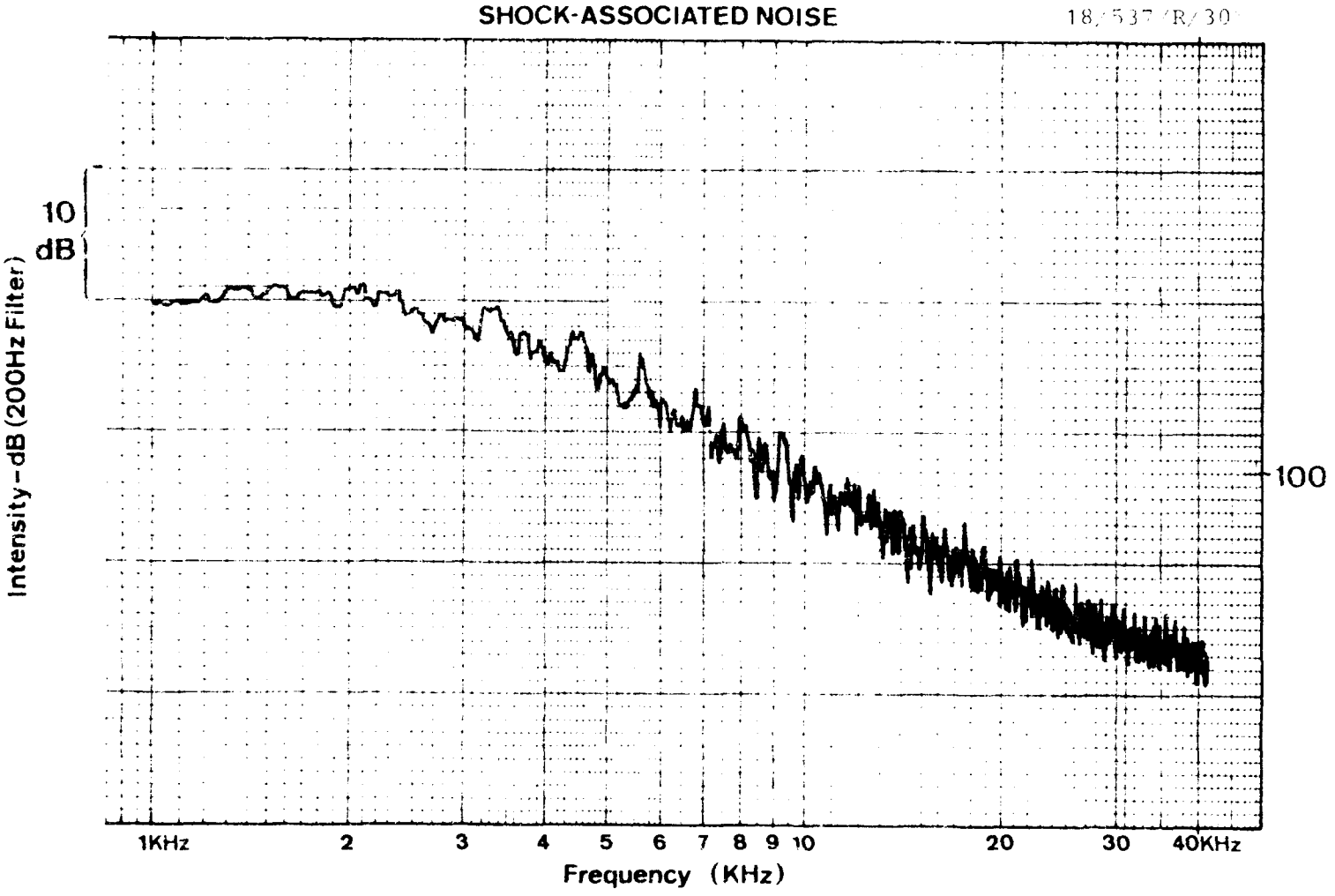

SHOCK-ASSOCIATED NOISE
10
dB
100
Intensity - dB (200Hz Filter)
1KHz
2
3
4
5
6
7
8
9
10
20
30
40KHz
Frequency (KHz)

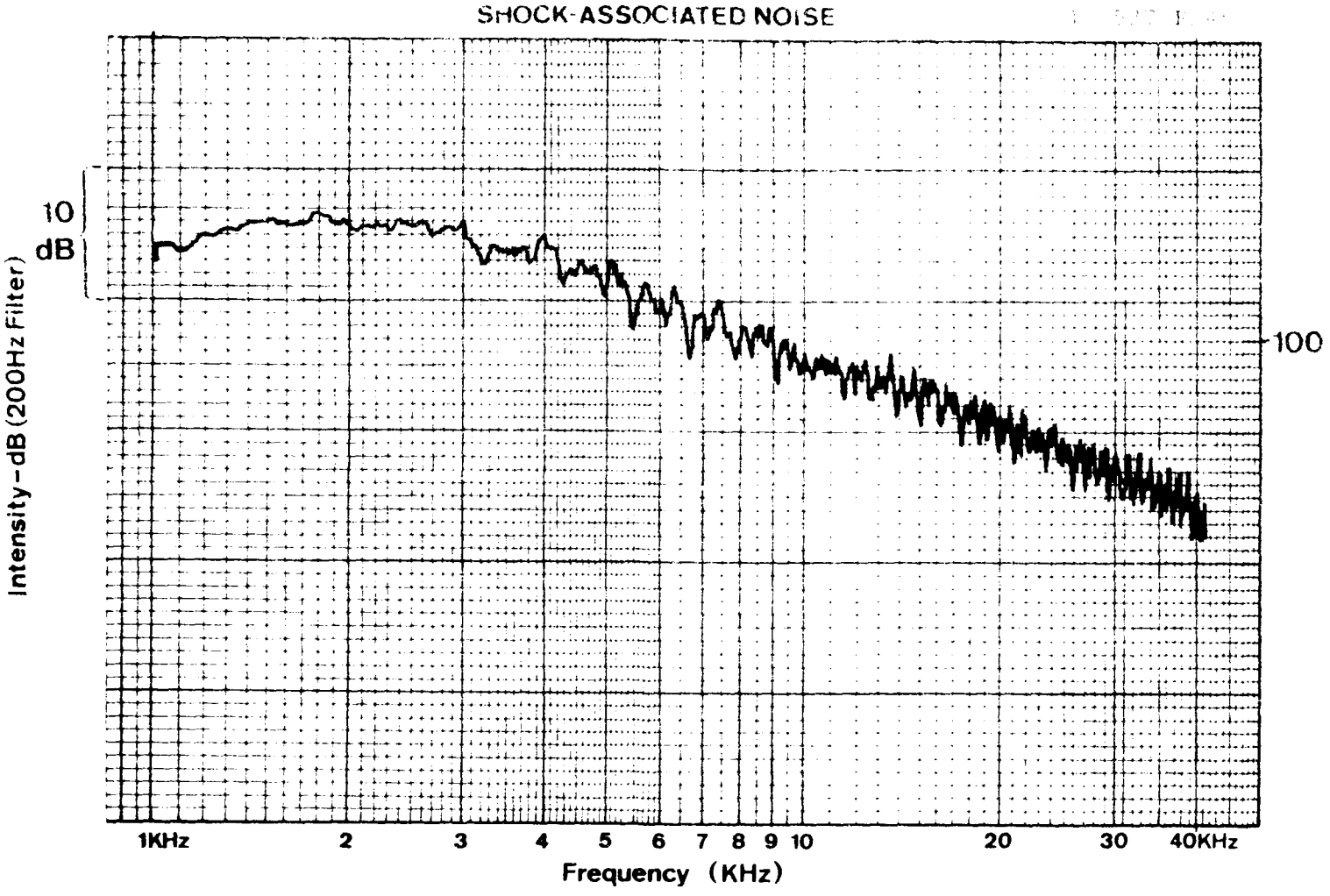

SHOCK-ASSOCIATED NOISE
17/561/F/105
10
dB
Intensity - dB (200Hz Filter)
100
1KHz
2
3
4
5
6
7
8
9
10
20
30
40KHz
Frequency (KHz)

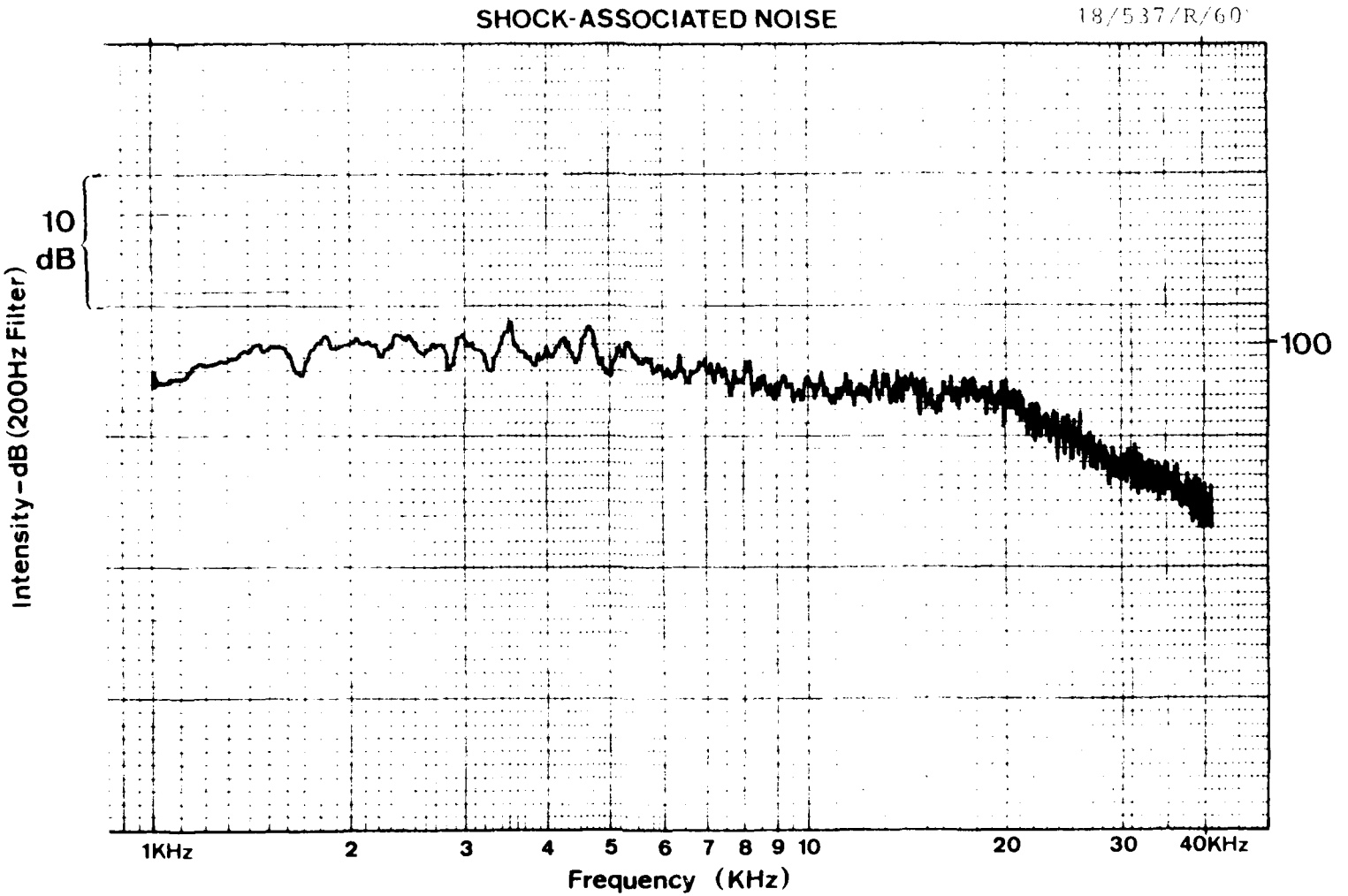

SHOCK-ASSOCIATED NOISE
17/561/F/120
10
dB
Intensity - dB (200Hz Filter)
100
1KHz
2
3
4
5
6
7
8
9
10
20
30
40KHz
Frequency (KHz)

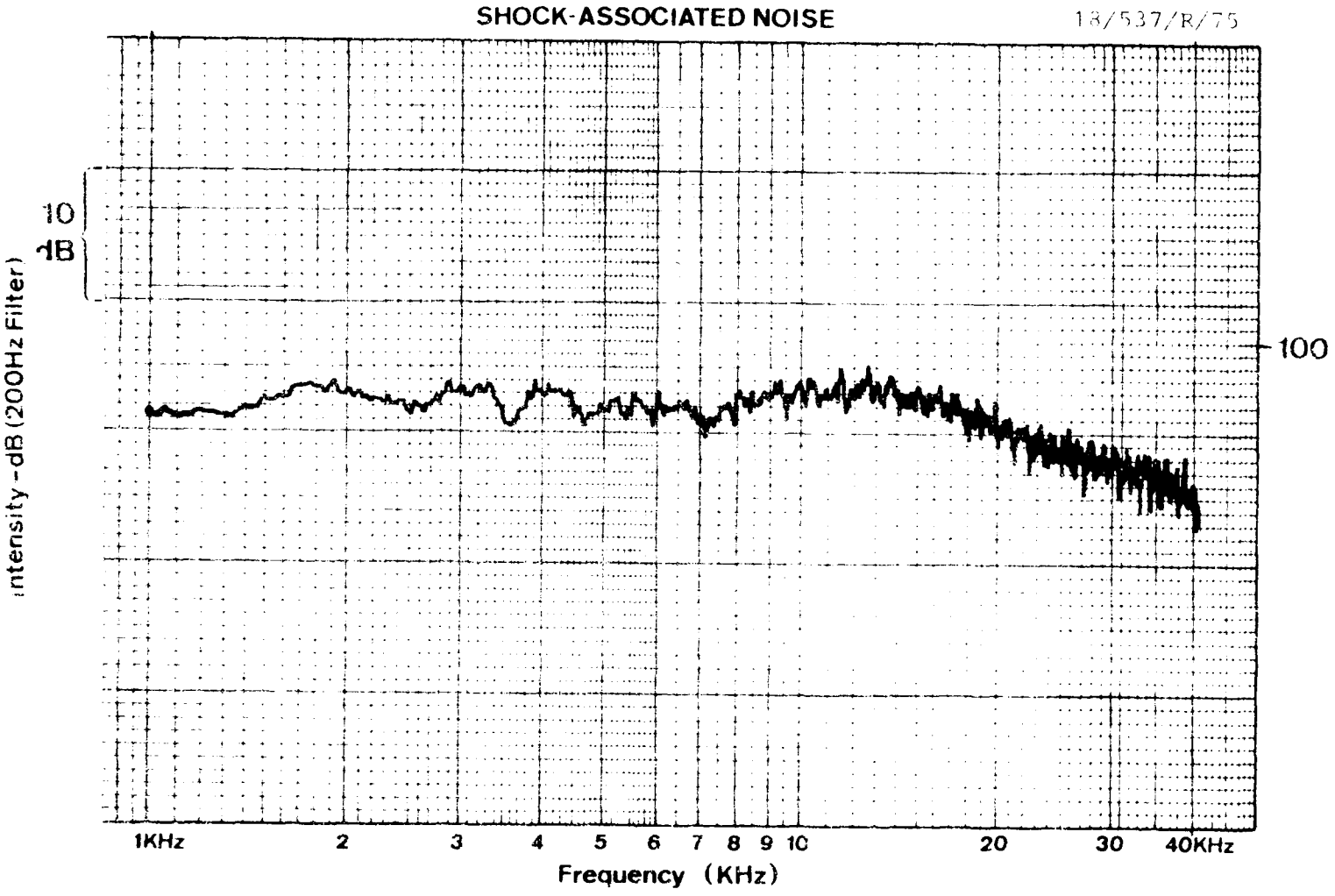

SHOCK-ASSOCIATED NOISE
17/561/P/135
10
dB
Intensity-dB (200Hz Filter)
100
1KHz
2
3
4
5
6
7
8
9
10
20
30
40KHz
Frequency (KHz)

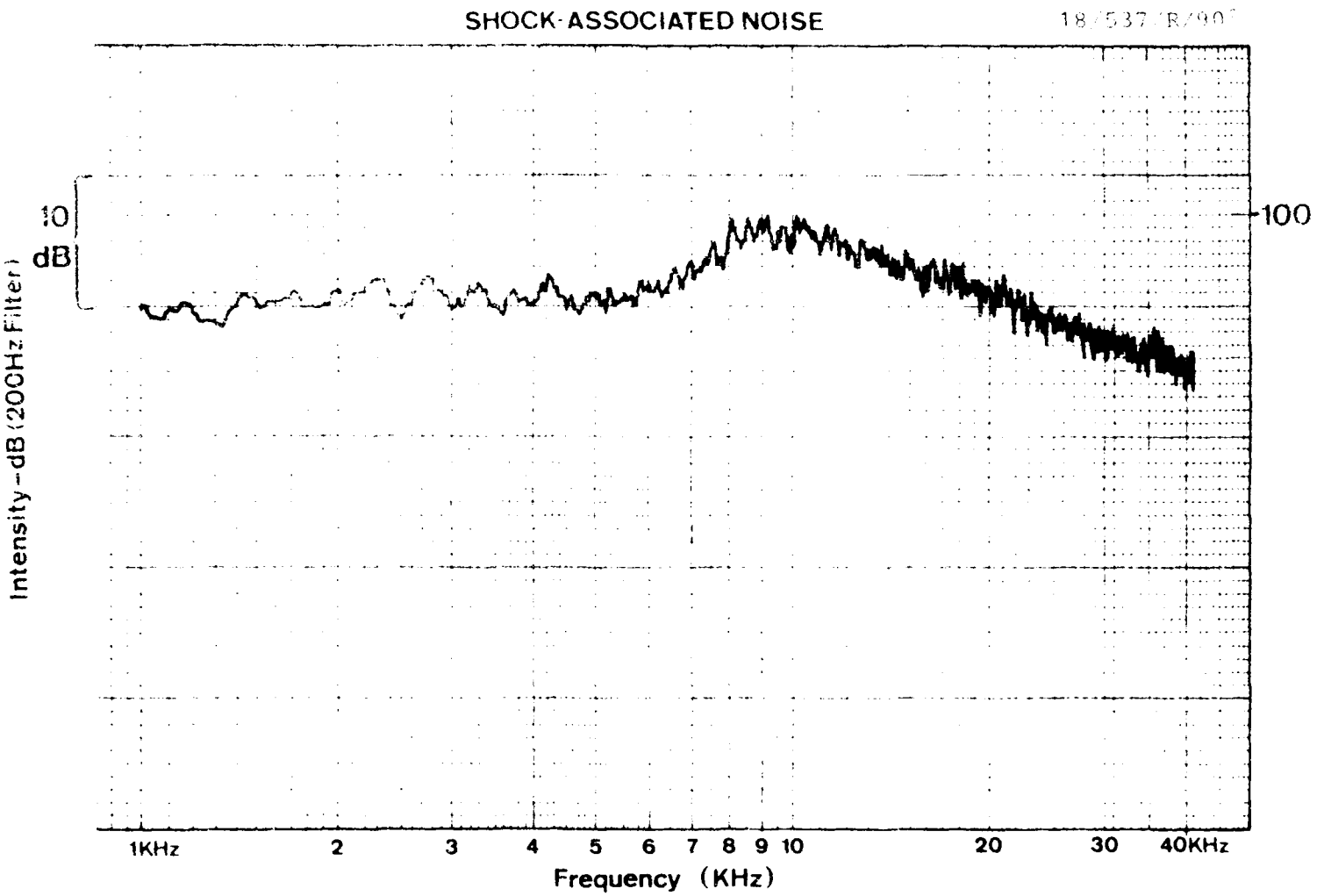

SHOCK-ASSOCIATED NOISE
10 dB
Intensity - dB (200Hz Filter)
100
1KHz
2
3
4
5
6
7
8
9
10
20
30
40KHz
Frequency (KHz)

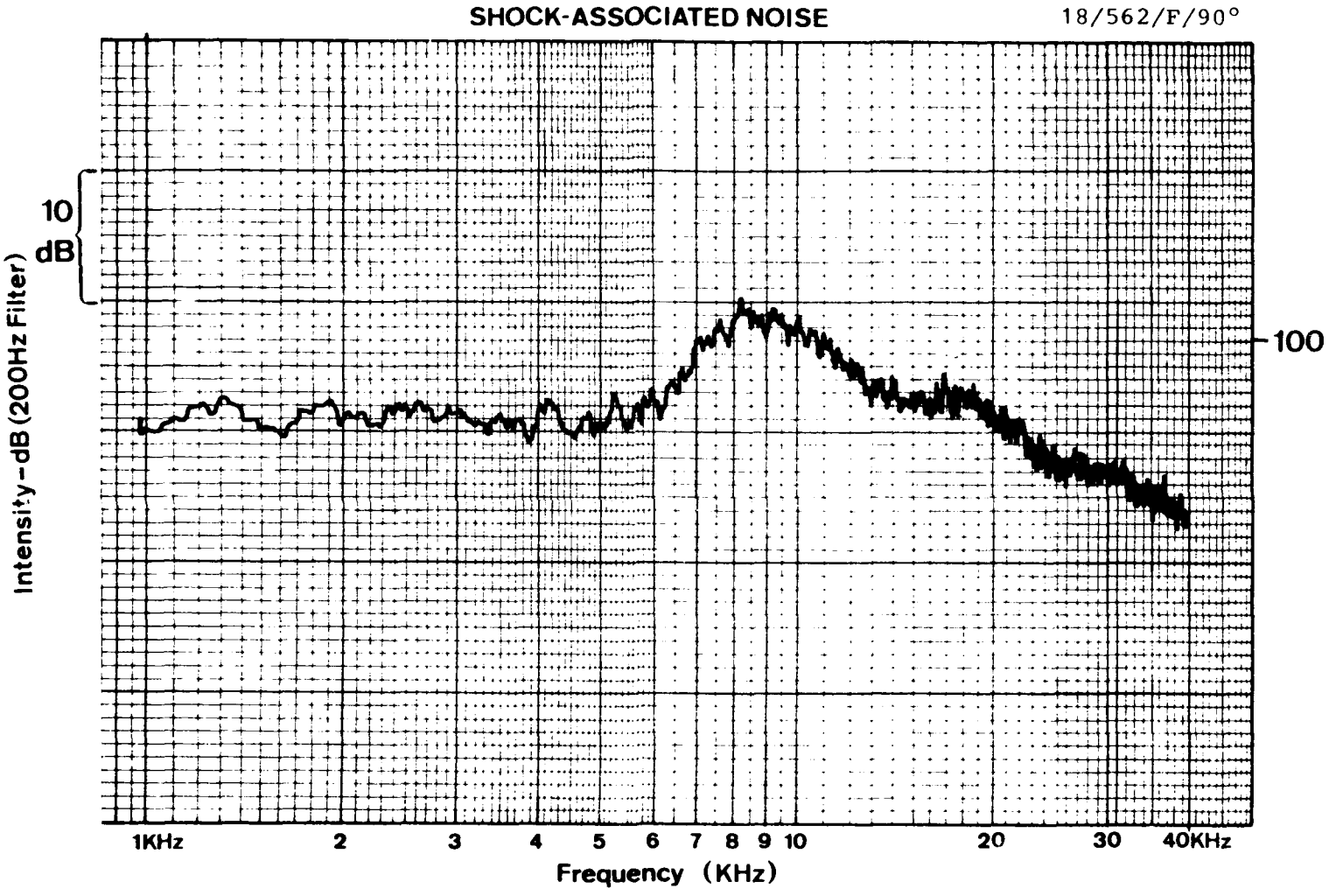

SHOCK-ASSOCIATED NOISE
18,537 (R/30)
10
dB
Intensity - dB (200Hz Filter)
100
1KHz
2
3
4
5
6
7
8
9
10
20
30
40KHz
Frequency (KHz)

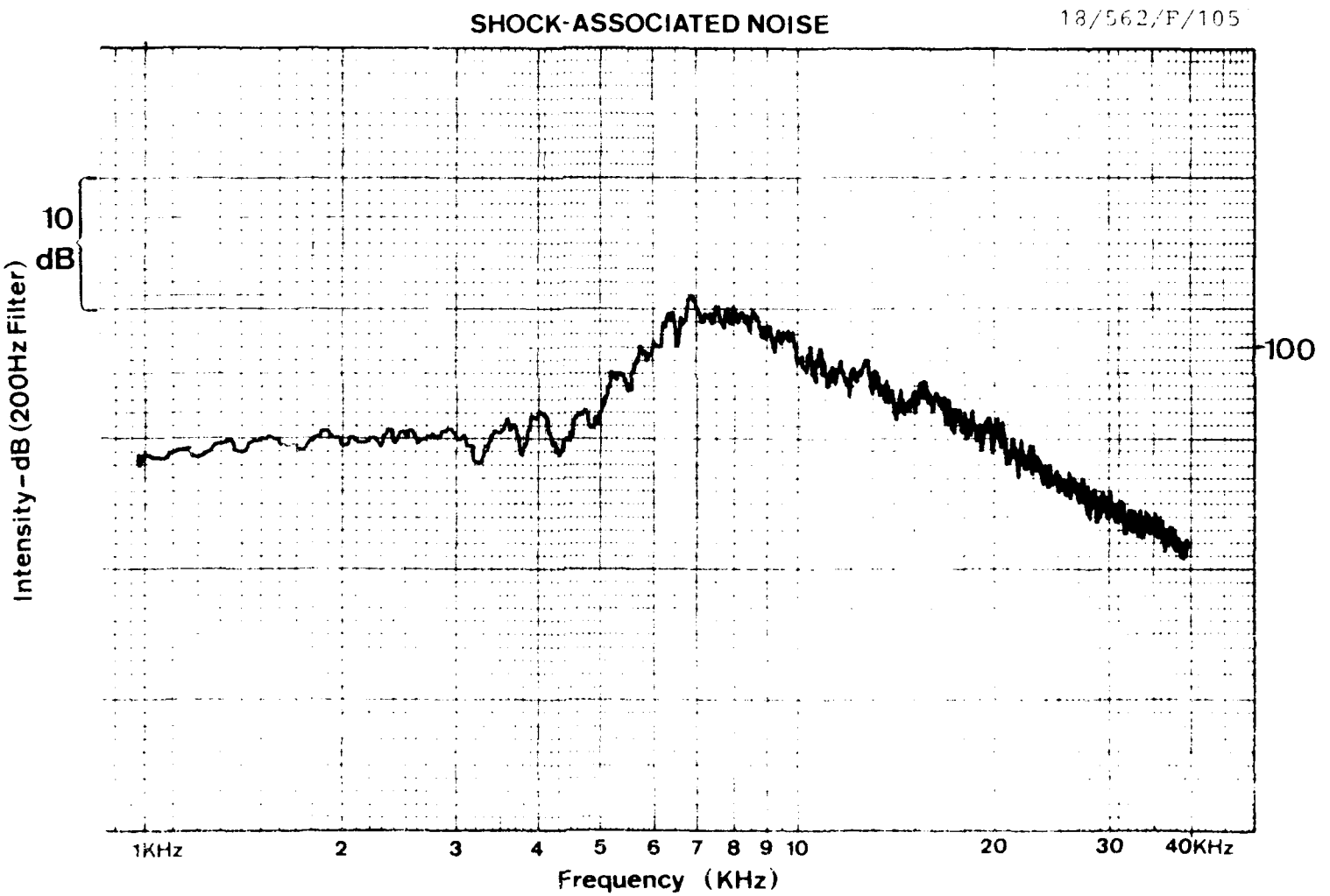

SHOCK-ASSOCIATED NOISE
10
dB
Intensity-dB (200Hz Filter)
100
1KHz
2
3
4
5
6
7
8
9
10
20
30
40KHz
Frequency (KHz)

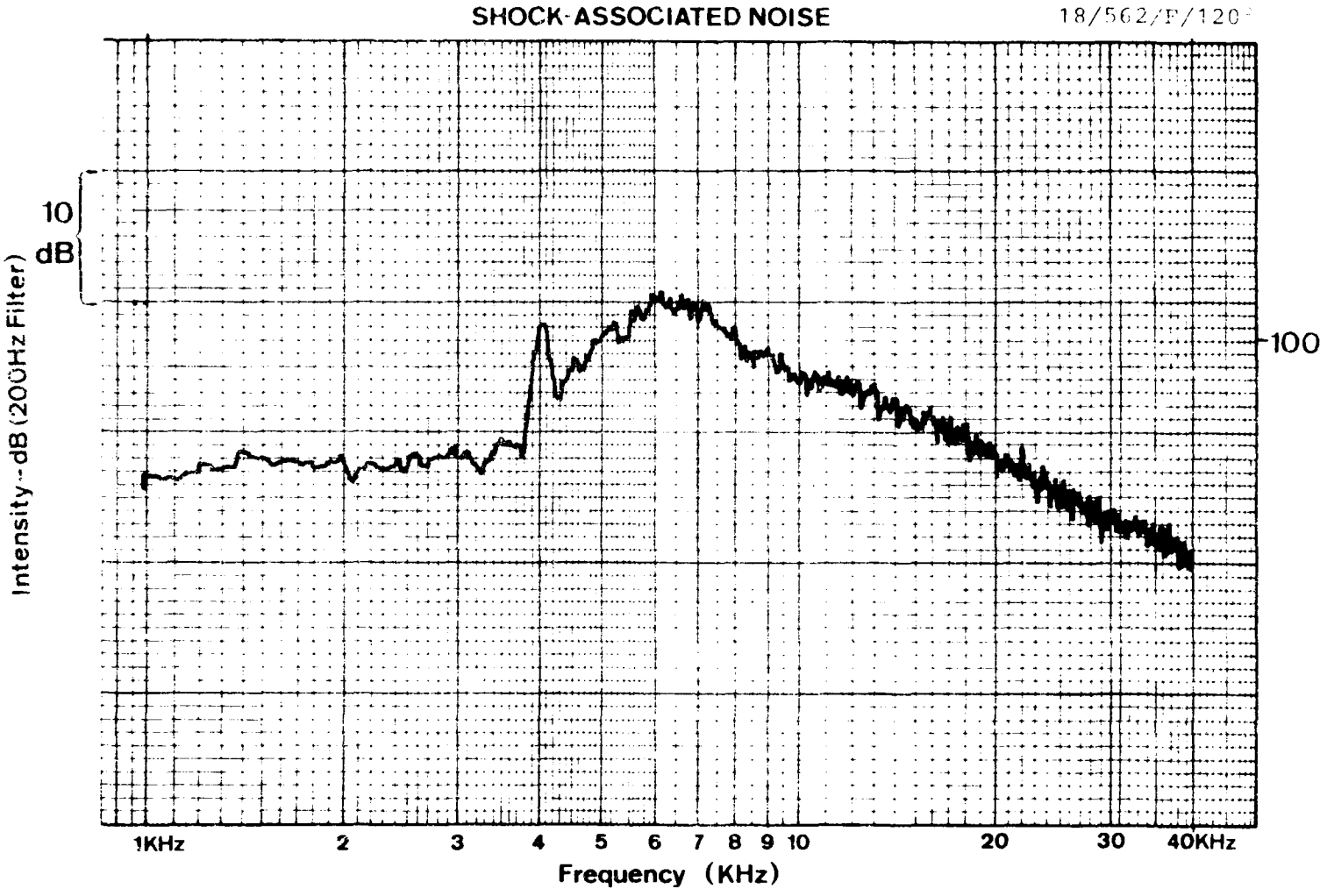

SHOCK-ASSOCIATED NOISE
18/537/R/60
10
dB
Intensity - dB (200Hz Filter)
100
1KHz
2
3
4
5
6
7
8
9
10
20
30
40KHz
Frequency (KHz)

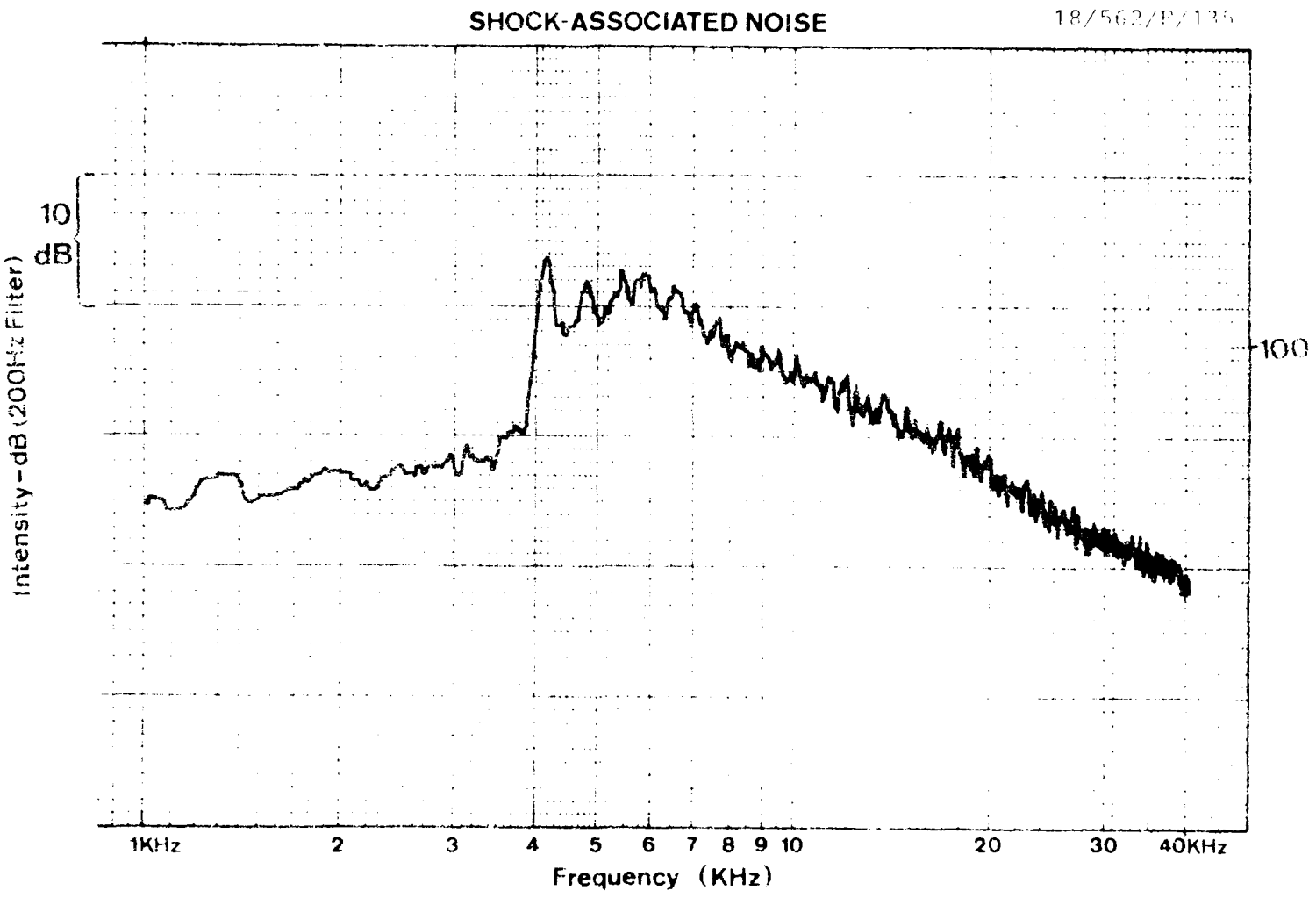

SHOCK-ASSOCIATED NOISE
18/537/R/75
10
dB
100
Intensity - dB (200Hz Filter)
1KHz
2
3
4
5
6
7
8
9
10
20
30
40KHz
Frequency (KHz)

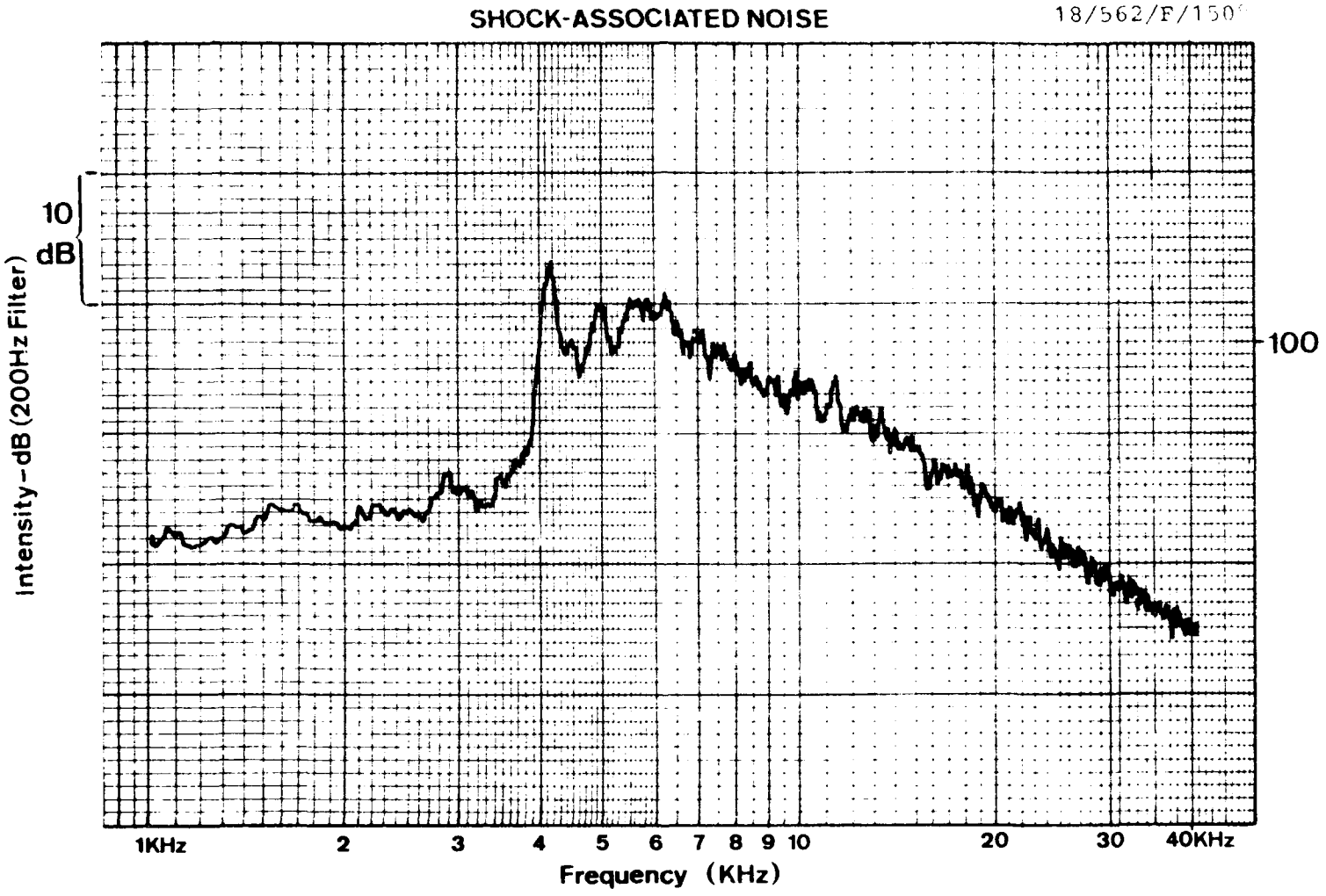

SHOCK-ASSOCIATED NOISE
10
dB
100
Intensity - dB (20CHz Filter)
1KHz
2
3
4
5
6
7
8
9
10
20
30
40KHz
Frequency (KHz)

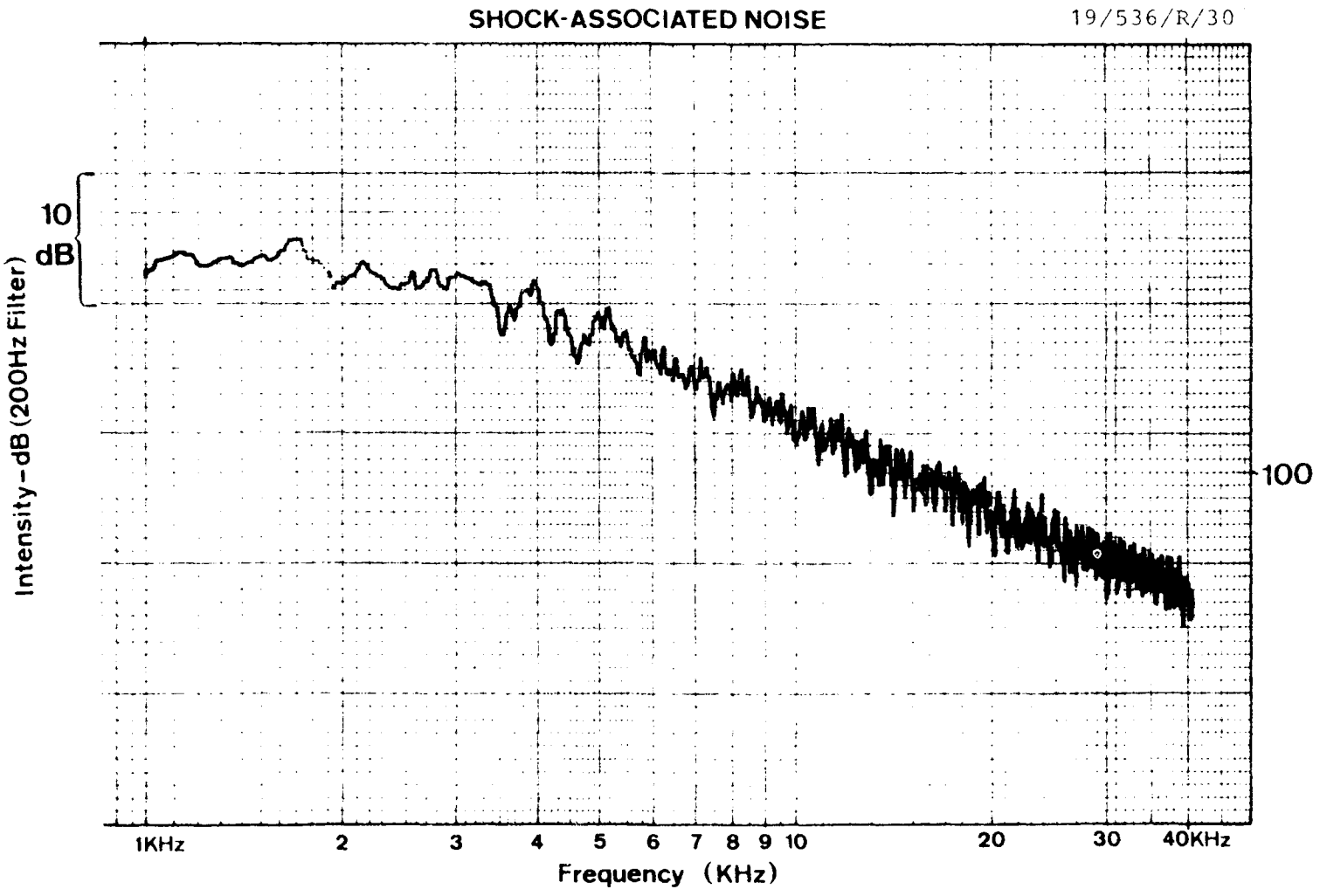

SHOCK-ASSOCIATED NOISE
18/562/F/90°
10
dB
Intensity-dB (200Hz Filter)
100
1KHz
2
3
4
5
6
7
8
9
10
20
30
40KHz
Frequency (KHz)

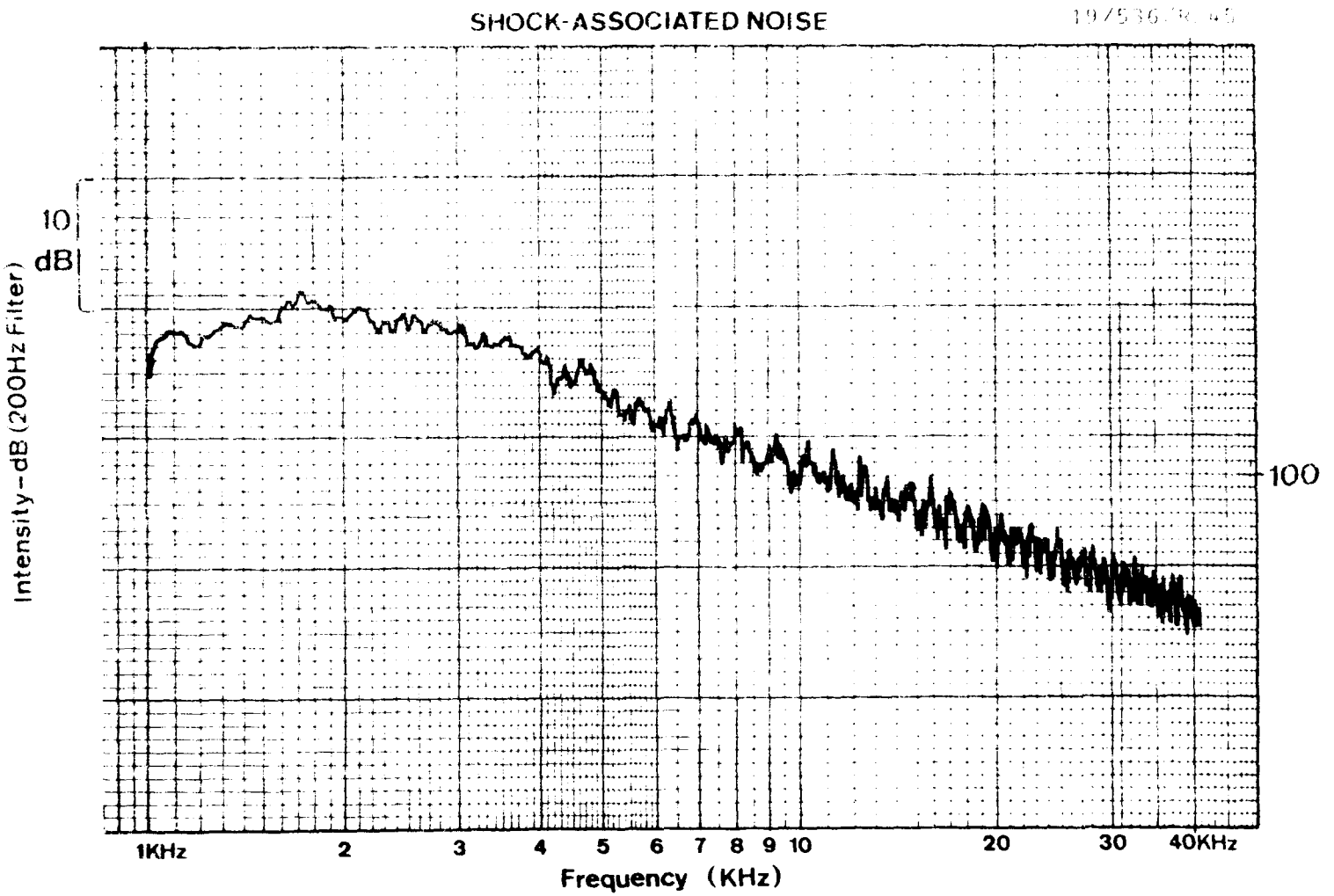

SHOCK-ASSOCIATED NOISE
18/562/F/105
10
dB
Intensity - dB (200Hz Filter)
100
1KHz
2
3
4
5
6
7
8
9
10
20
30
40KHz
Frequency (KHz)

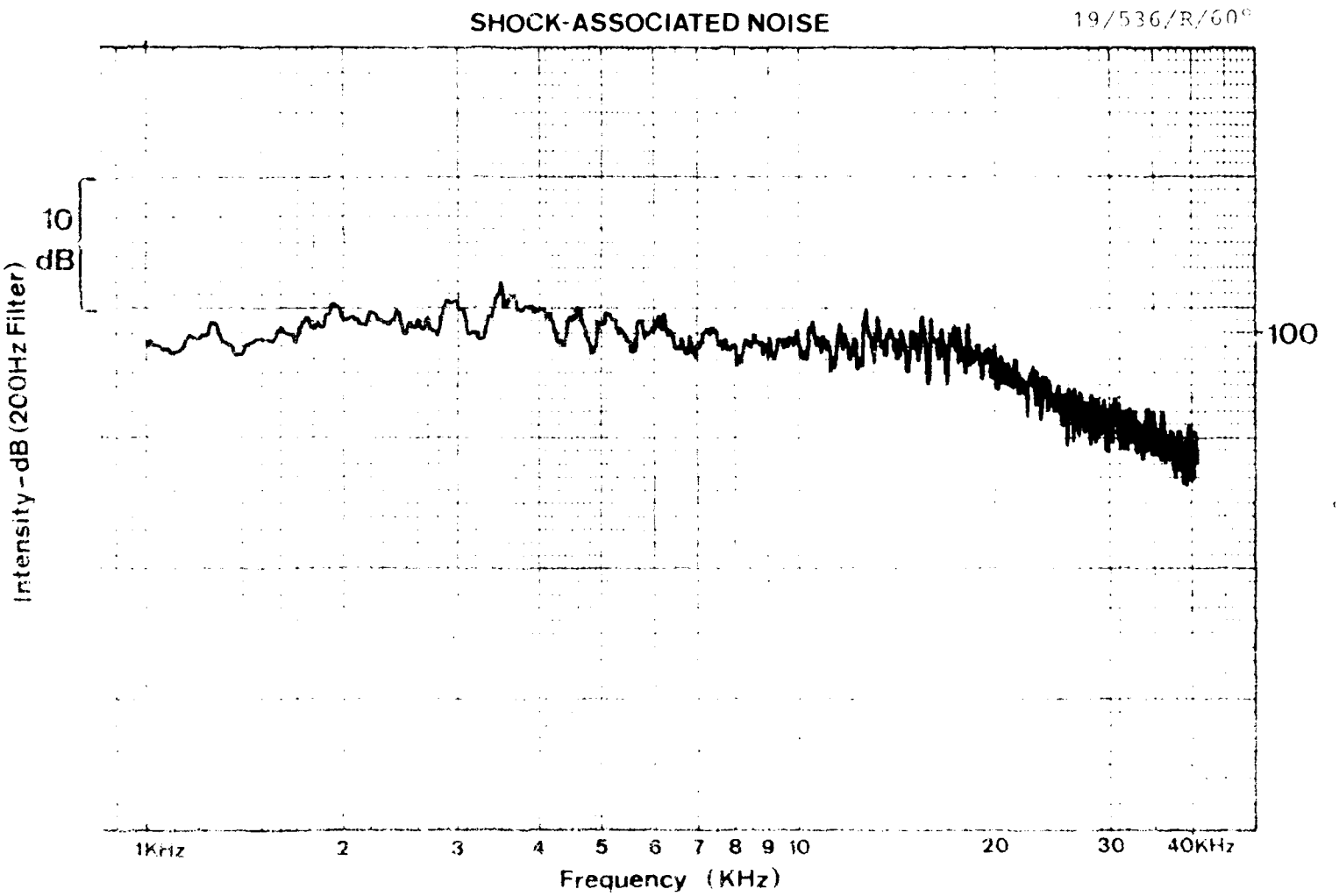

SHOCK-ASSOCIATED NOISE
18/562/F/120
10
dB
Intensity--dB (200Hz Filter)
100
1KHz
2
3
4
5
6
7
8
9
10
20
30
40KHz
Frequency (KHz)

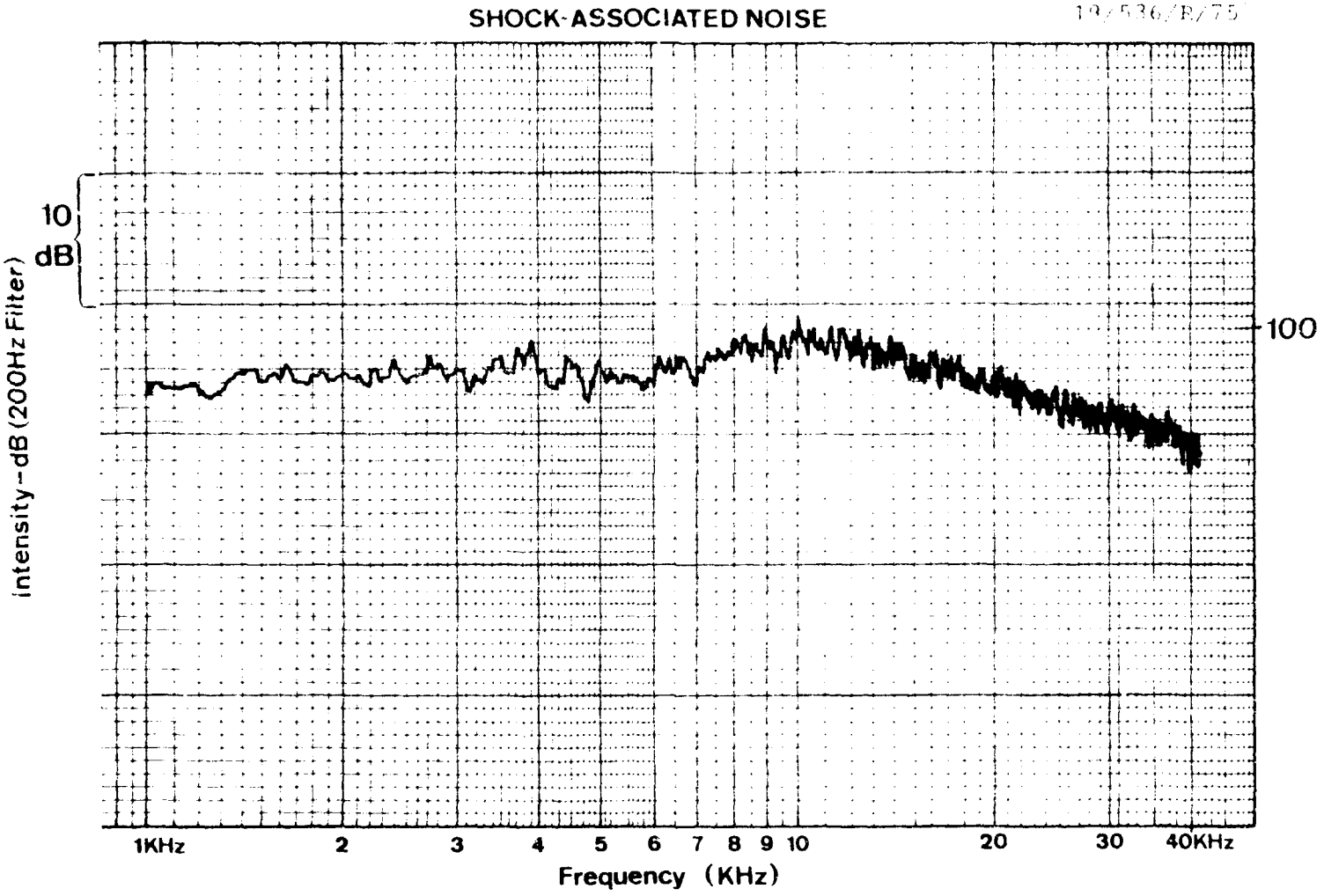

SHOCK-ASSOCIATED NOISE
18/562/P/135
10
dB
Intensity - dB (200Hz Filter)
100
1KHz
2
3
4
5
6
7
8
9
10
20
30
40KHz
Frequency (KHz)

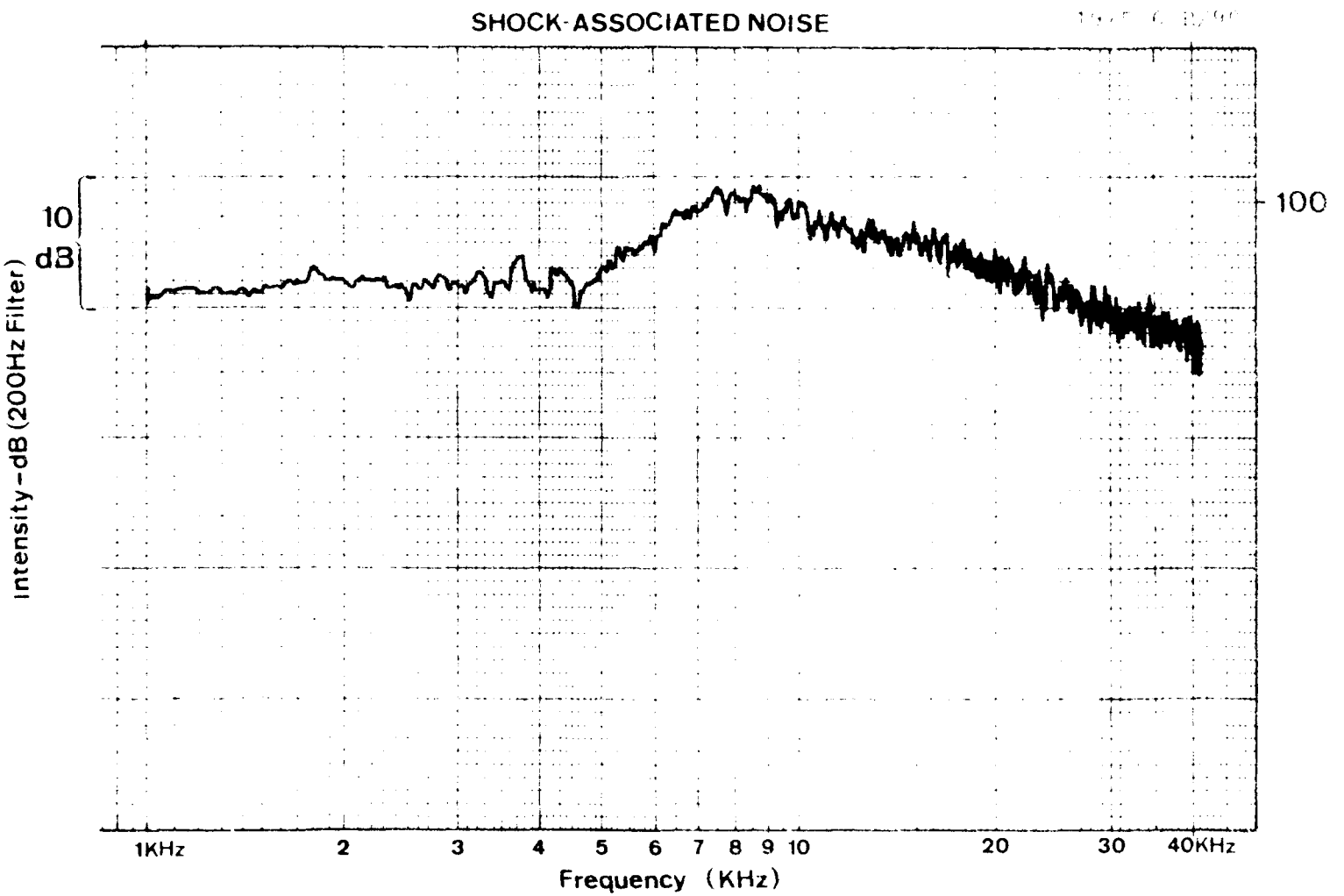

SHOCK-ASSOCIATED NOISE
18/562/F/150
10
dB
Intensity-dB (200Hz Filter)
100
1KHz
2
3
4
5
6
7
8
9
10
20
30
40KHz
Frequency (KHz)

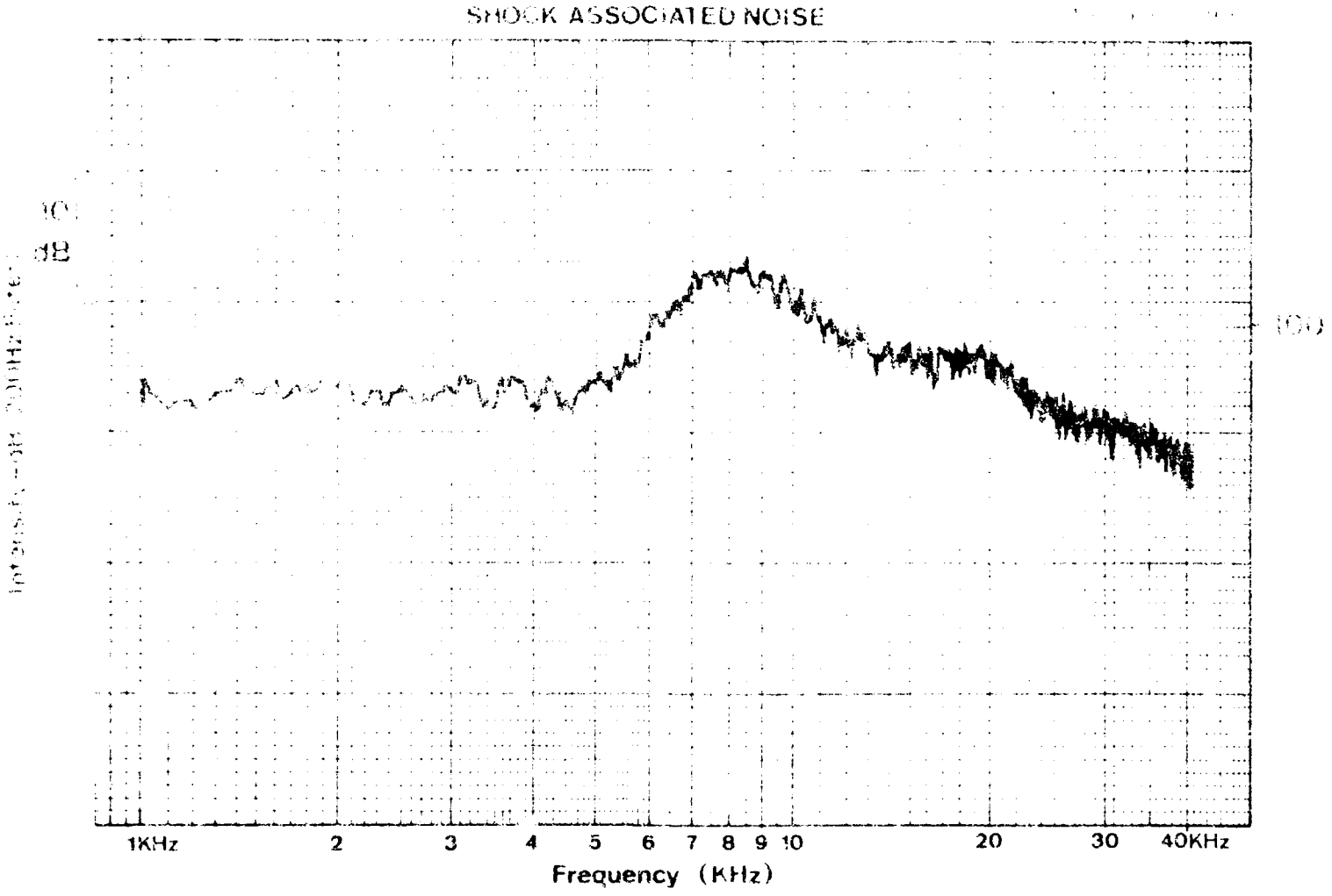

SHOCK-ASSOCIATED NOISE
19/536/R/30
10
dB
Intensity - dB (200Hz Filter)
100
1KHz
2
3
4
5
6
7
8
9
10
20
30
40KHz
Frequency (KHz)

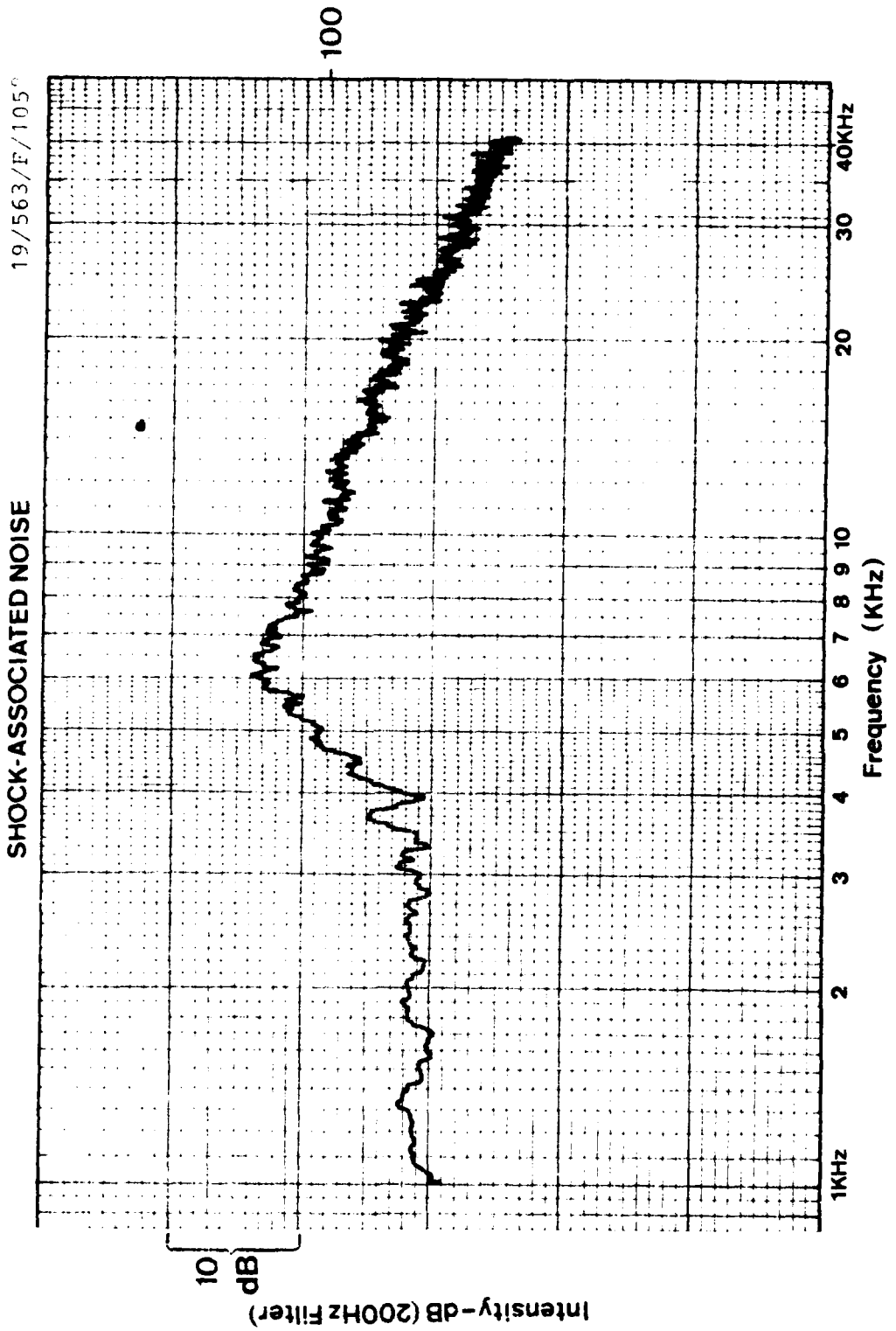

SHOCK-ASSOCIATED NOISE
10
dB
Intensity-dB (200Hz Filter)
100
1KHz
2
3
4
5
6
7
8
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
19/536/R/60
10
dB
Intensity - dB (200Hz Filter)
100
1KHz
2
3
4
5
6
7
8
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
19/536/B/75
10
dB
Intensity - dB (200Hz Filter)
100
1KHz
2
3
4
5
6
7
8
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
10
dB
100
Intensity-dB (200Hz Filter)
1KHz
2
3
4
5
6
7
8
9
10
20
30
40KHz
Frequency (KHz)


SHOCK ASSOCIATED NOISE
dB
1KHz
2
3
4
5
6
7
8
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
19/563/F/105
100
10 dB
Intensity–dB (200Hz Filter)
1KHz
2
3
4
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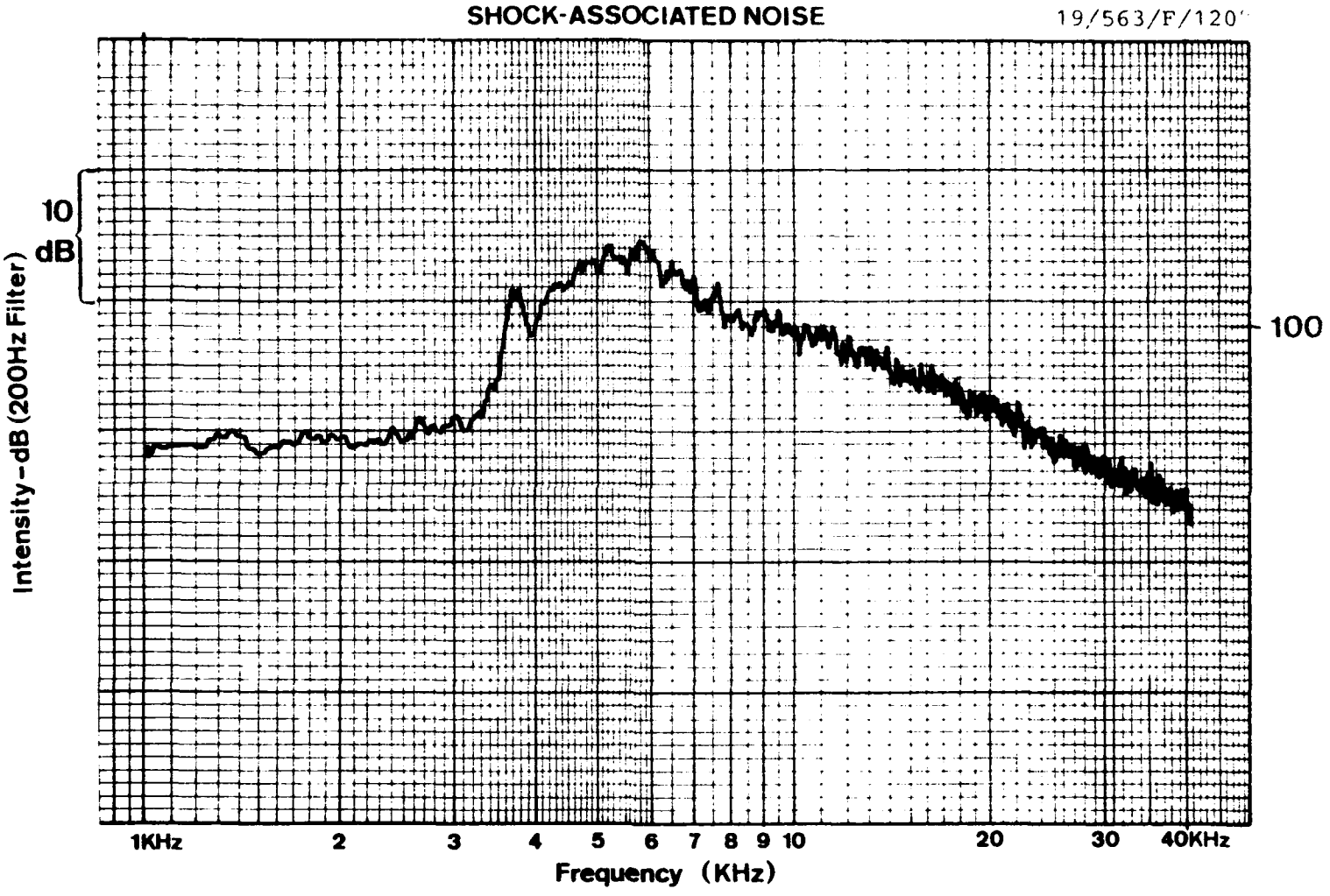
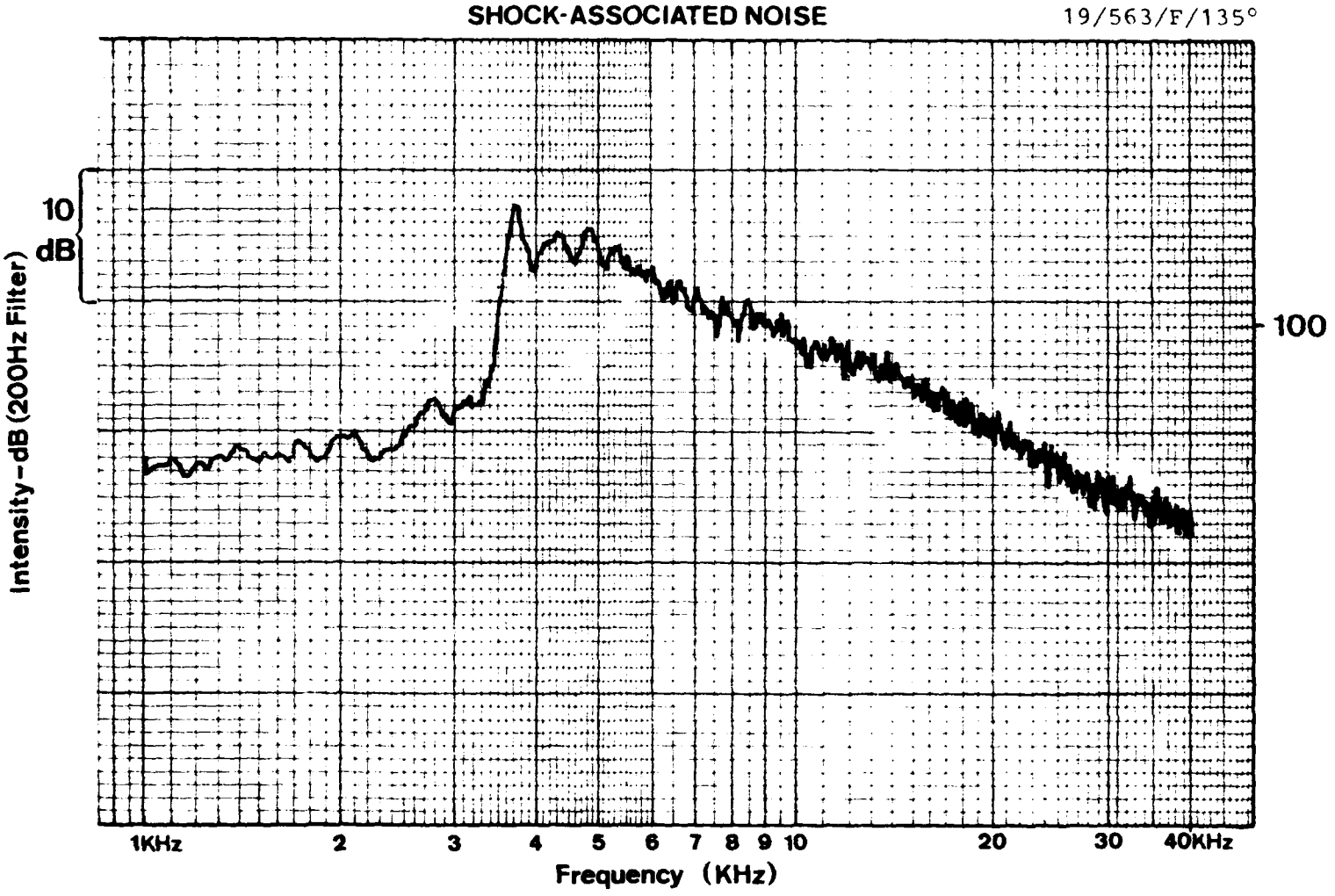
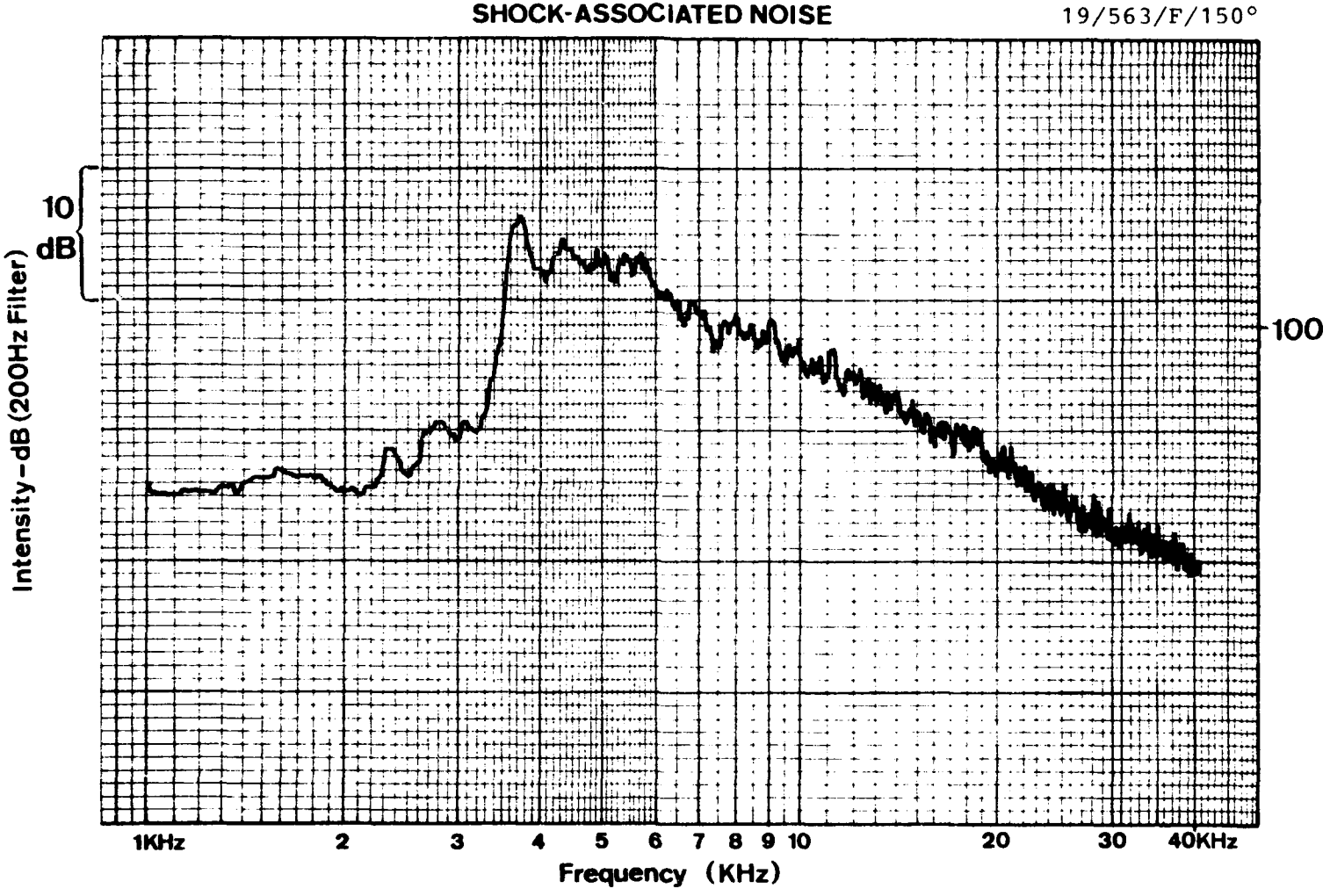
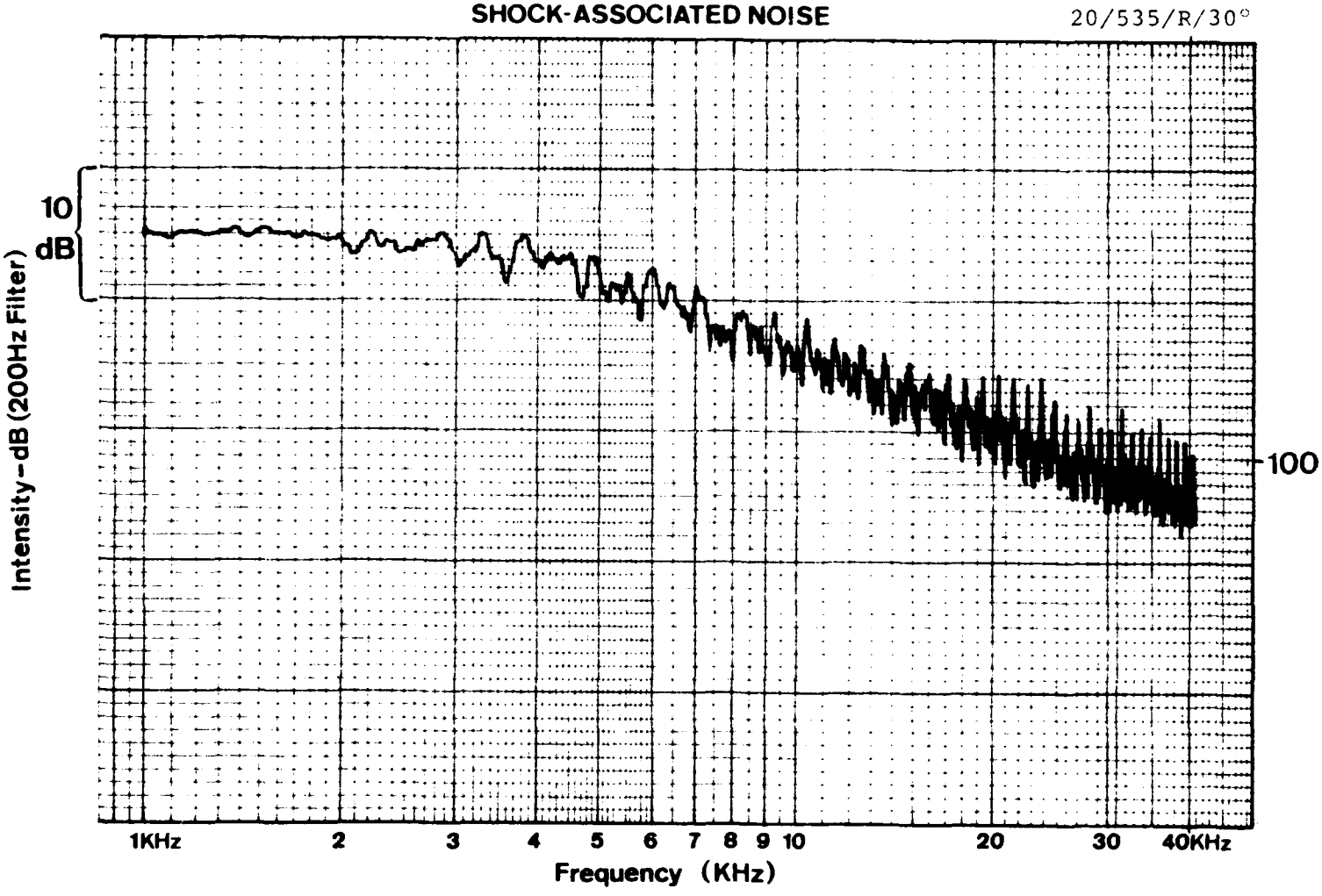
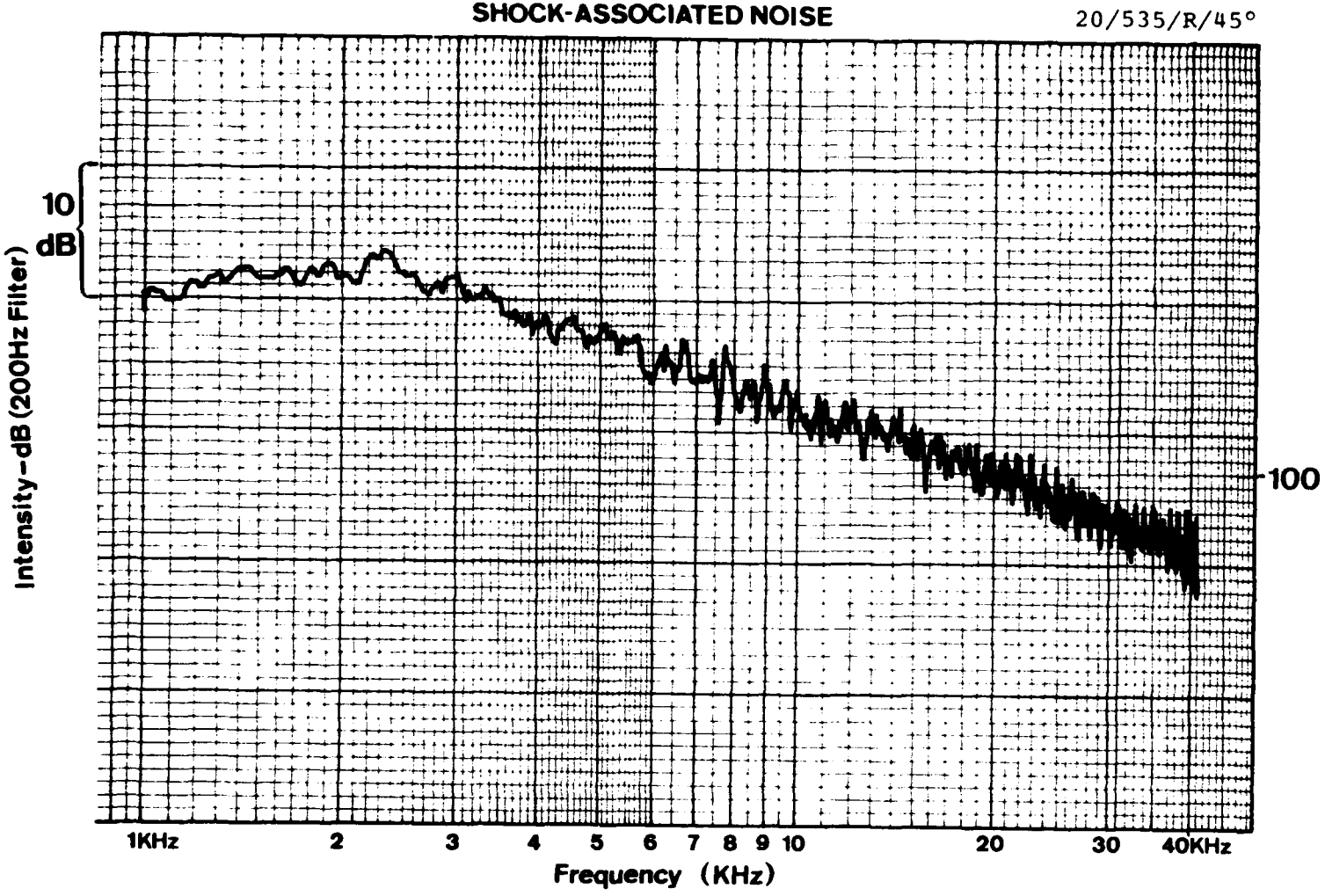
6
7
8
9
10
20
30
40KHz
Frequency (KHz)

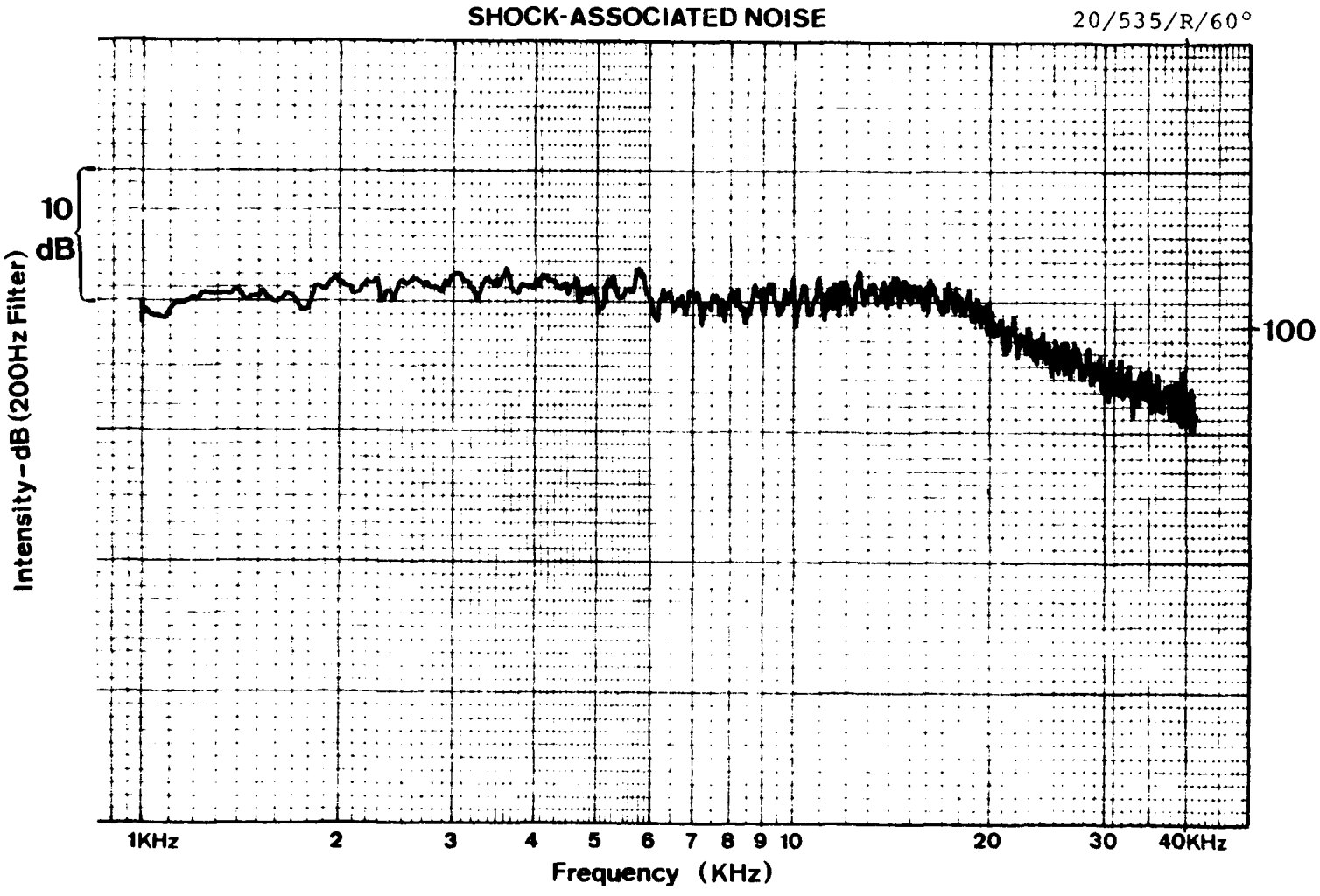

SHOCK-ASSOCIATED NOISE
19/563/F/120
10
dB
Intensity - dB (200Hz Filter)
100
1KHz
2
3
4
5
6
7
8
9
10
20
30
40KHz
Frequency (KHz)

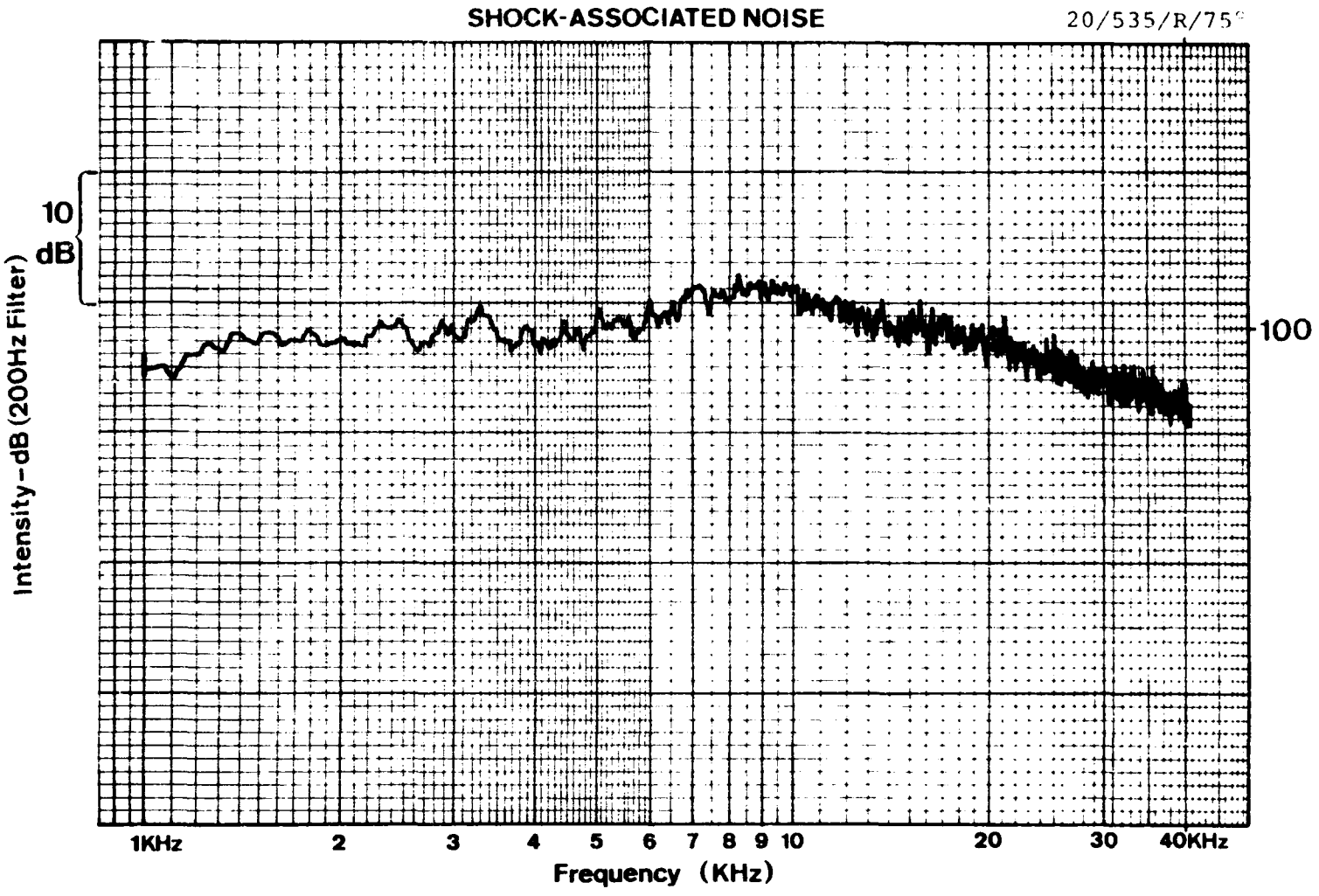

SHOCK-ASSOCIATED NOISE
19/563/F/135°
10
dB
Intensity-dB (200Hz Filter)
100
1KHz
2
3
4
5
6
7
8
9
10
20
30
40KHz
Frequency (KHz)

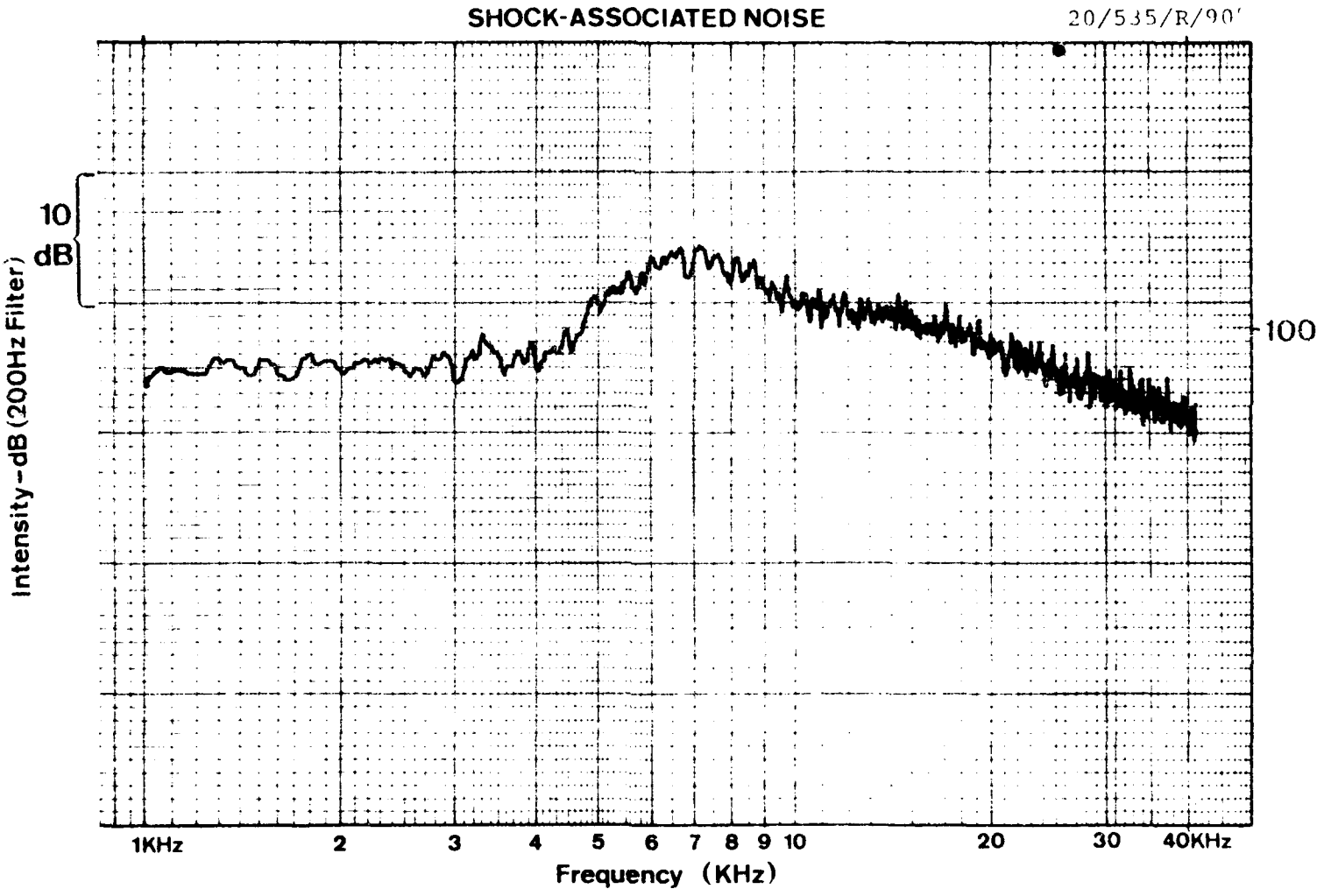

SHOCK-ASSOCIATED NOISE
19/563/F/150°
10
dB
Intensity-dB (200Hz Filter)
100
1KHz
2
3
4
5
6
7
8
9
10
20
30
40KHz
Frequency (KHz)

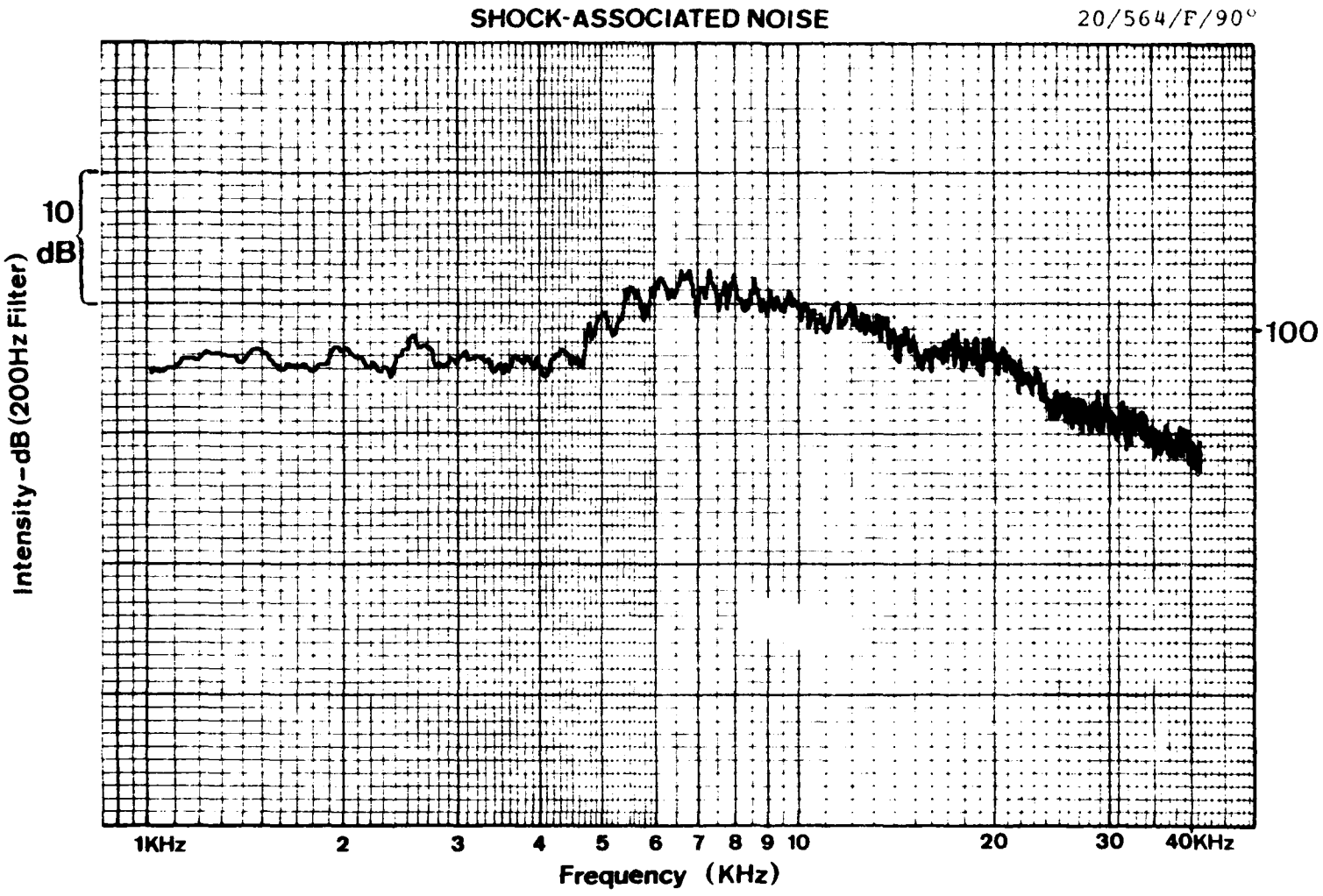

SHOCK-ASSOCIATED NOISE
20/535/R/30°
10
dB
Intensity-dB (200Hz Filter)
100
1KHz
2
3
4
5
6
7
8
9
10
20
30
40KHz
Frequency (KHz)

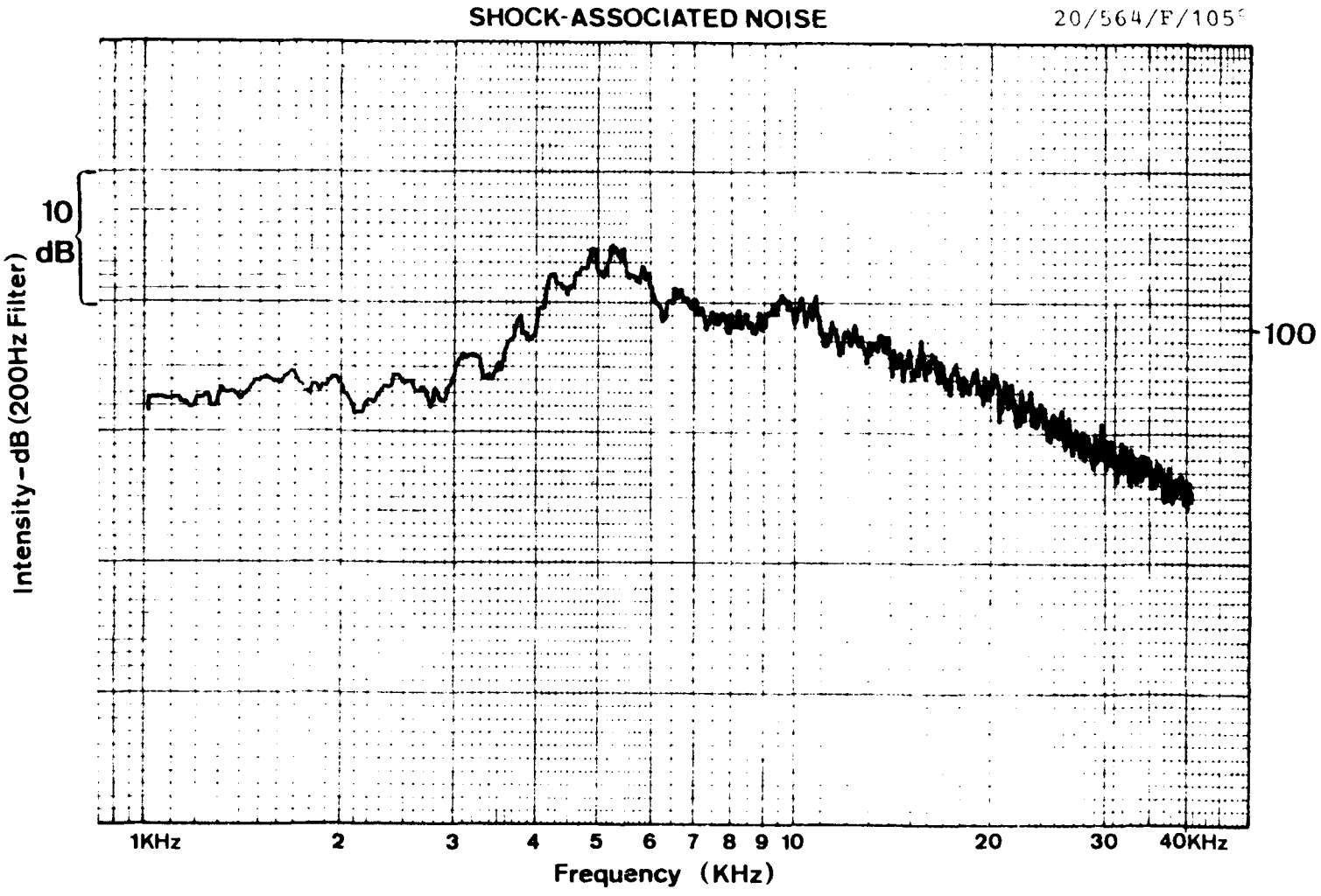

SHOCK-ASSOCIATED NOISE
20/535/R/45°
10
dB
Intensity-dB (200Hz Filter)
100
1KHz
2
3
4
5
6
7
8
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
20/535/R/60°
10
dB
Intensity-dB (200Hz Filter)
100
1KHz
2
3
4
5
6
7
8
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
20/535/R/75
10
dB
Intensity-dB (200Hz Filter)
100
1KHz
2
3
4
5
6
7
8
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
20/535/R/90'
10
dB
Intensity-dB (200Hz Filter)
100
1KHz
2
3
4
5
6
7
8
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
20/564/F/90°
10
dB
Intensity-dB (200Hz Filter)
100
1KHz
2
3
4
5
6
7
8
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
20/564/F/105
10
dB
Intensity-dB (200Hz Filter)
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1KHz
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10
20
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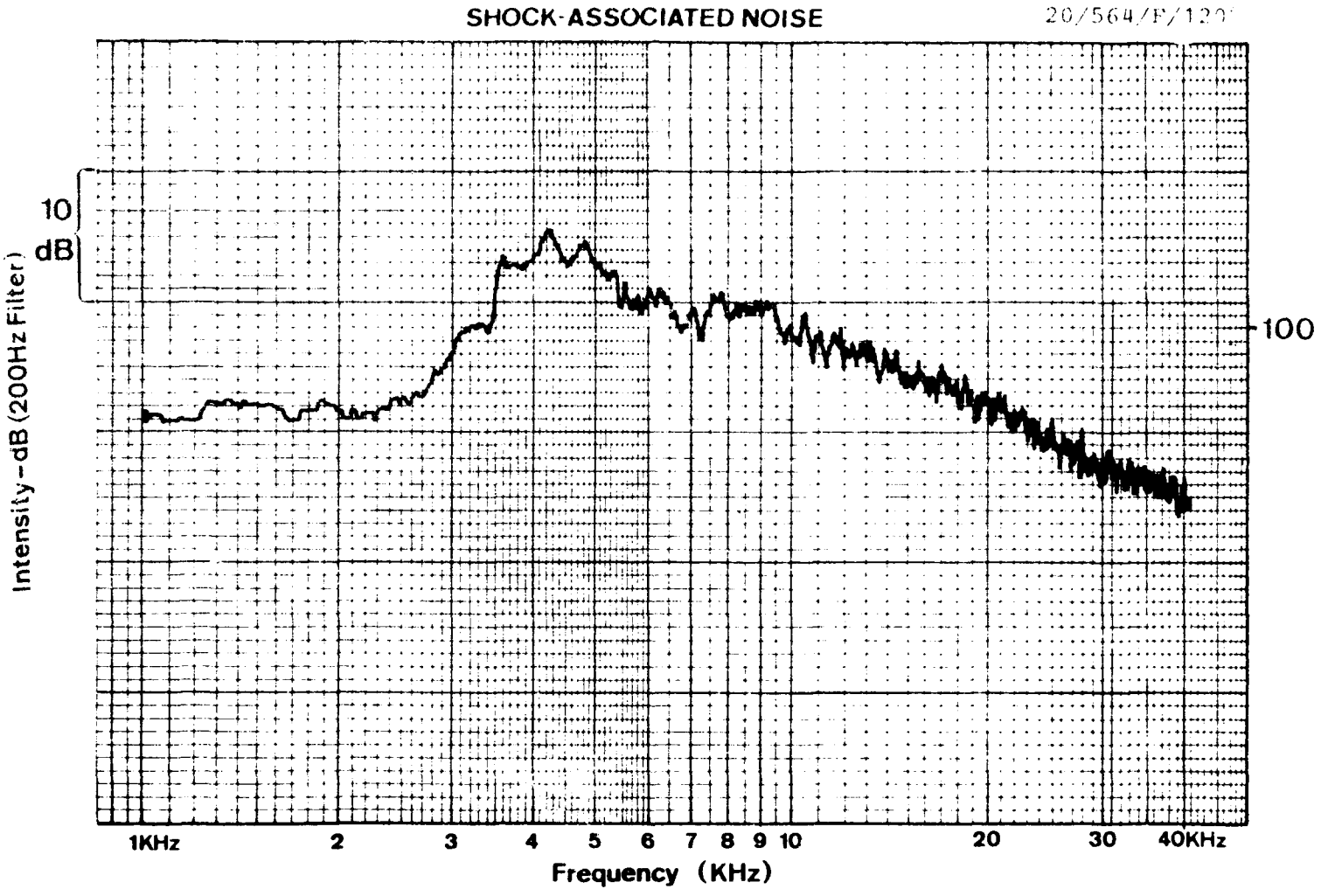
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
20/564/F/120
10
dB
Intensity - dB (200Hz Filter)
100
1KHz
2
3
4
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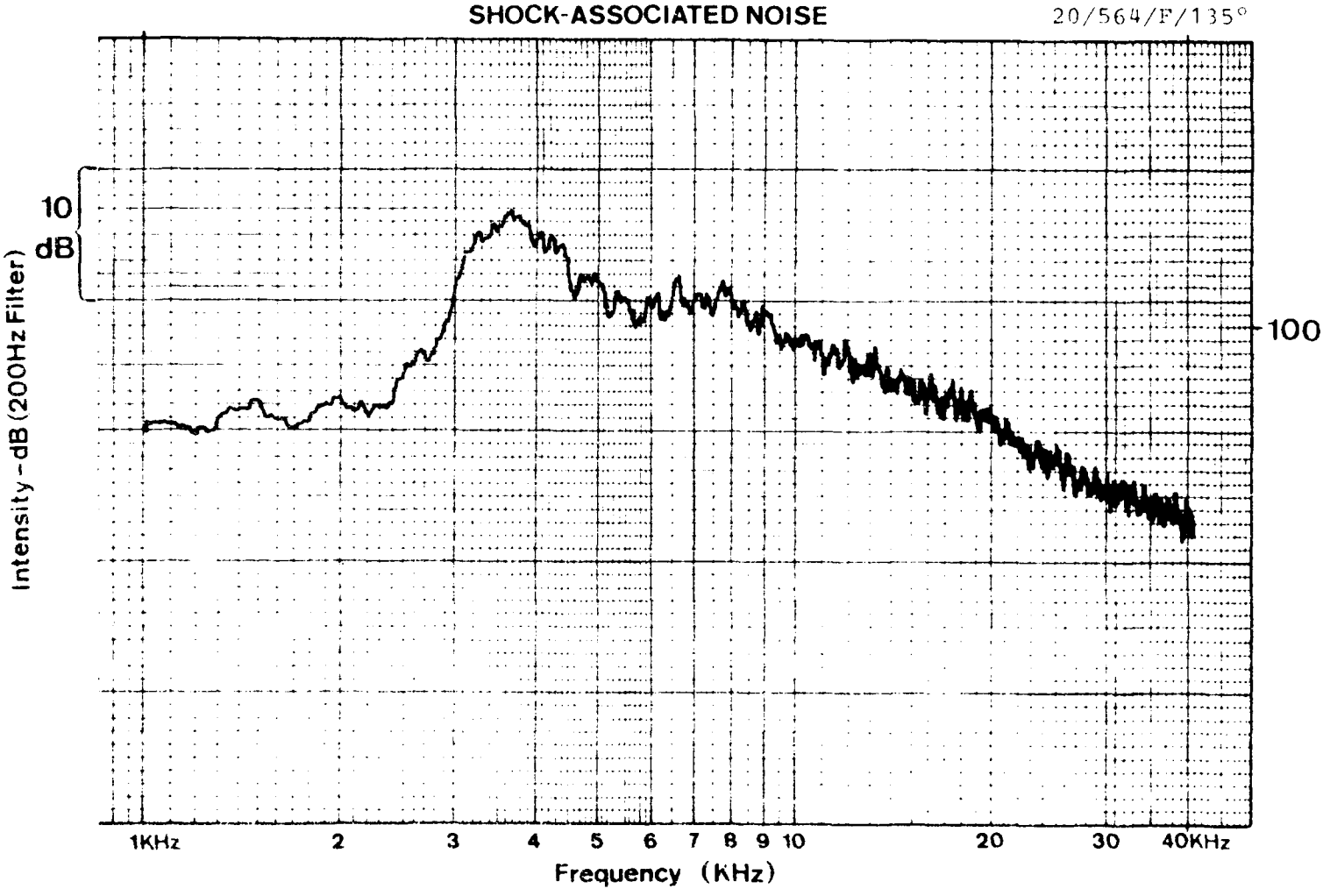
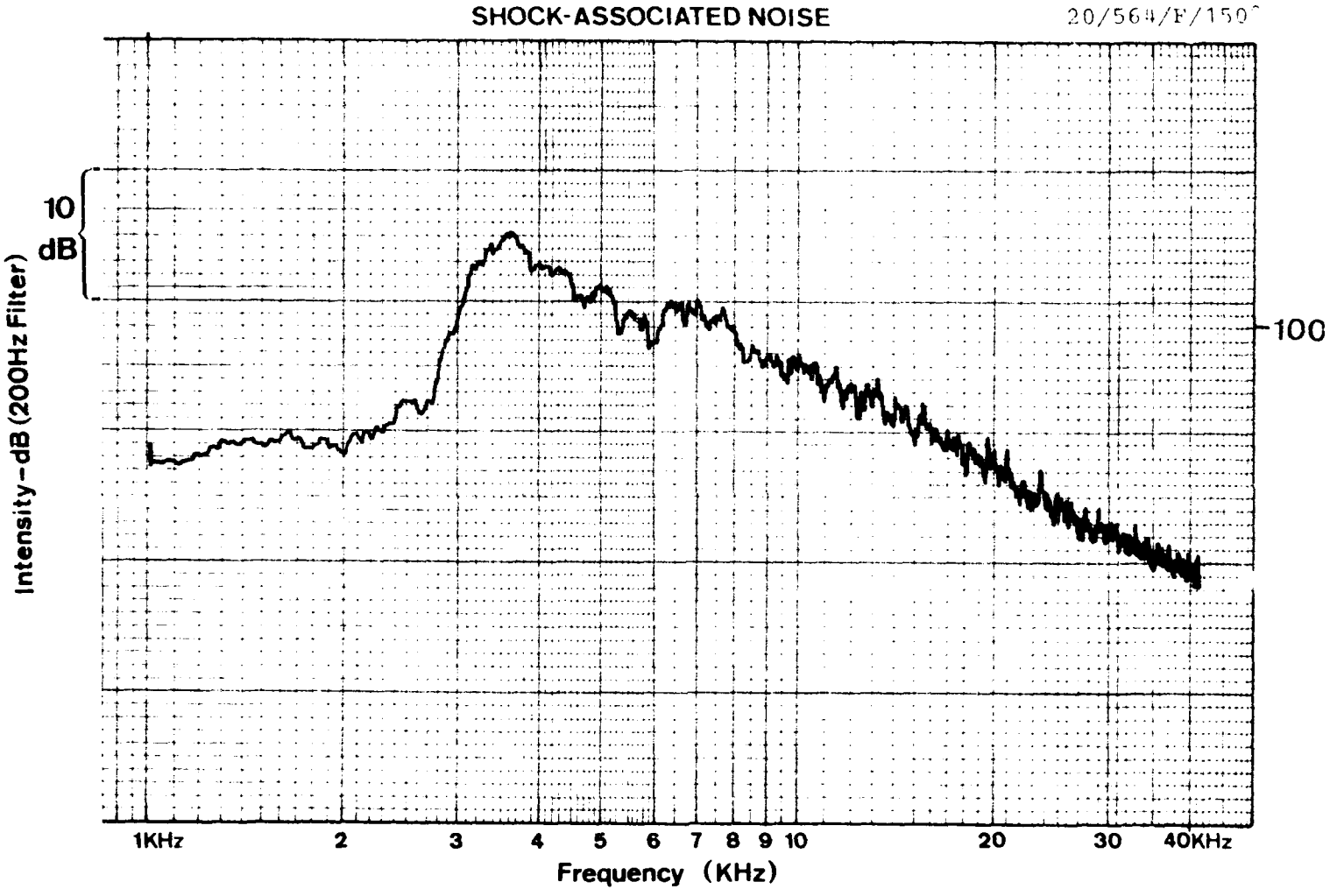
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
20/564/F/135°
10
dB
Intensity - dB (200Hz Filter)
100
1KHz
2
3
4
5
6
7
8
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
20/564/F/150
10
dB
Intensity-dB (200Hz Filter)
100
1KHz
2
3
4
5
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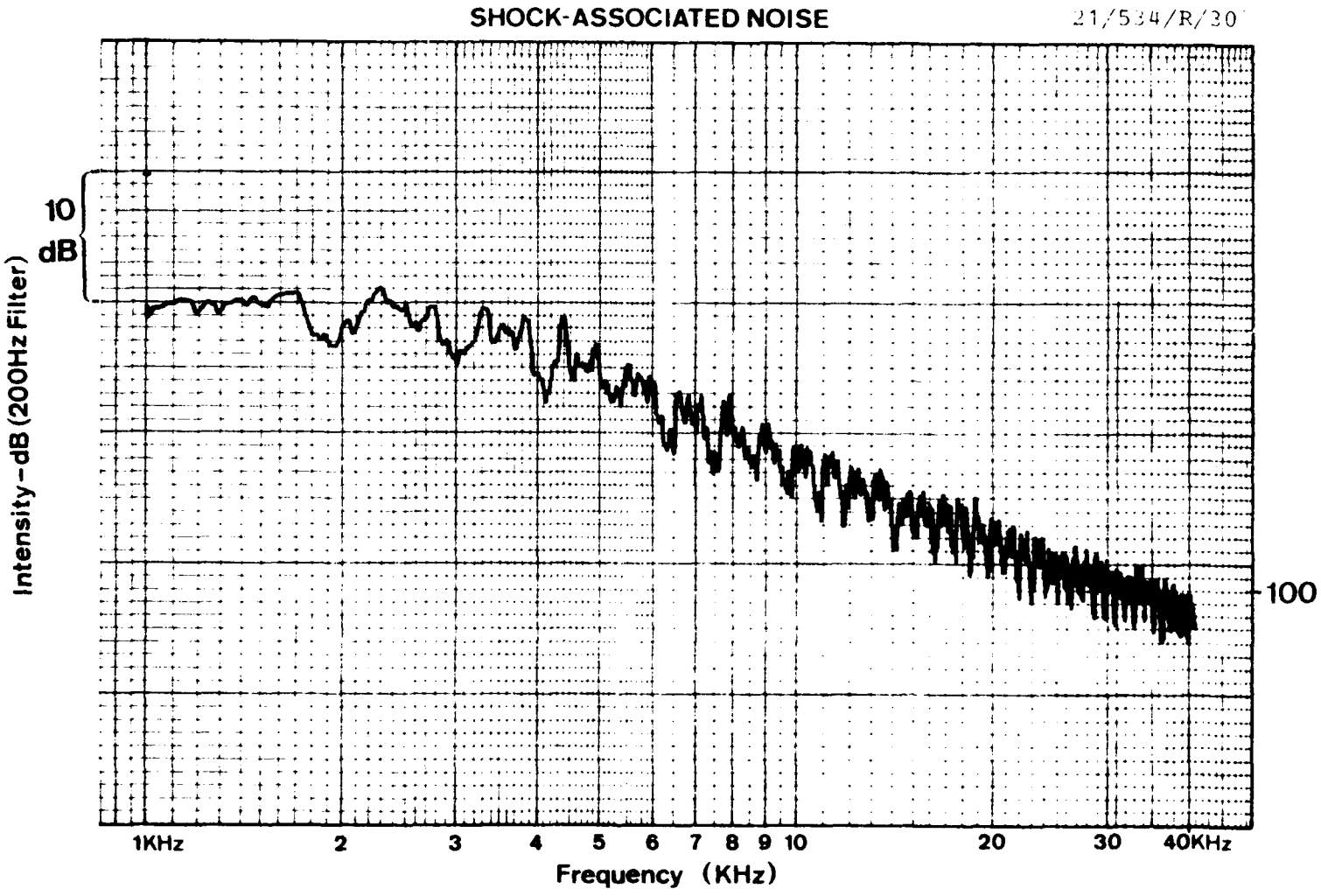
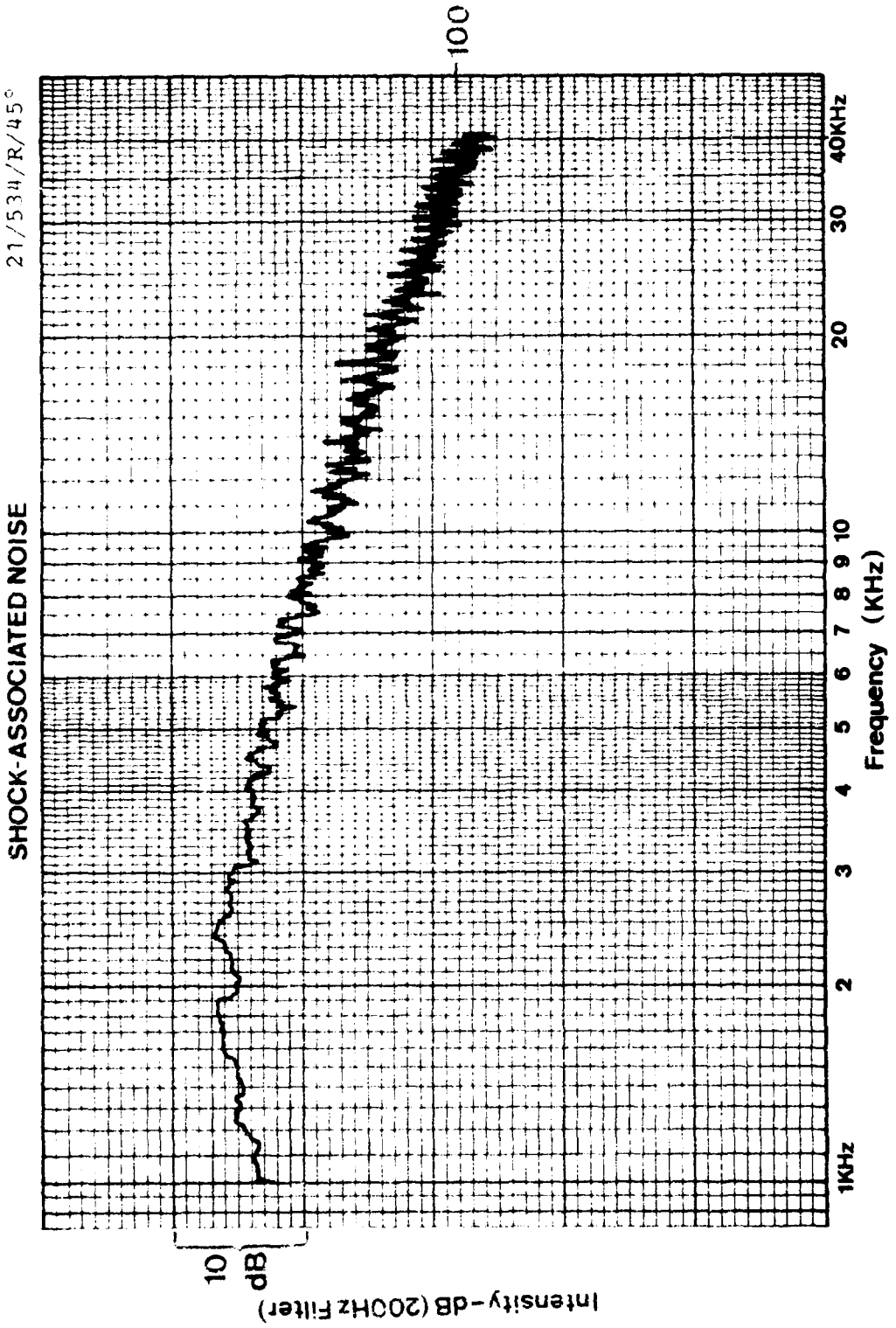
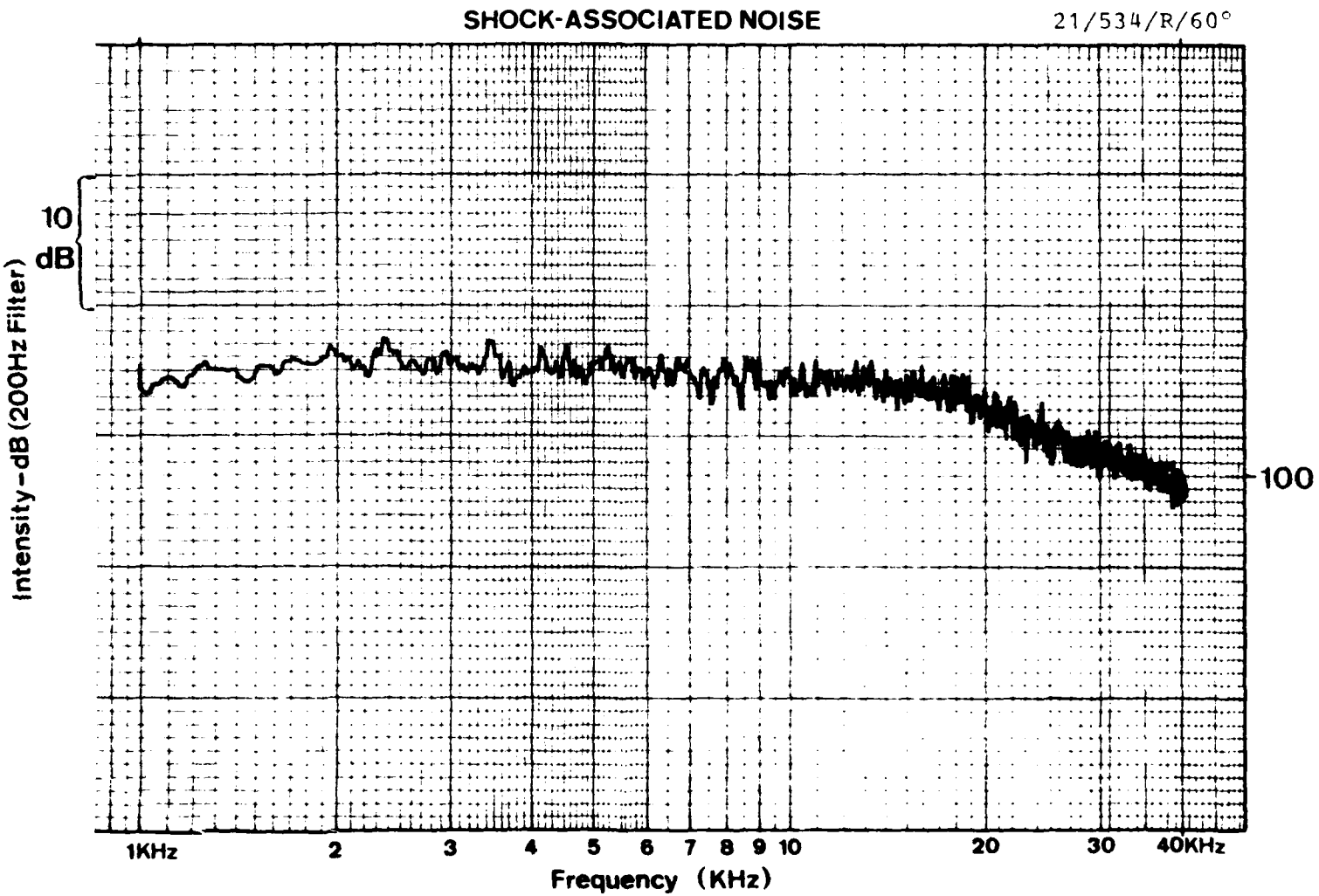
7
8
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
21/534/R/30
10
dB
Intensity-dB (200Hz Filter)
100
1KHz
2
3
4
5
6
7
8
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
21/534/R/45°
100
1KHz
2
3
4
5
6
7
8
9
10
20
30
40KHz
Frequency (KHz)
10 dB
Intensity-dB (200Hz Filter)


SHOCK-ASSOCIATED NOISE
21/534/R/60°
10 dB
Intensity - dB (200Hz Filter)
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1KHz
2
3
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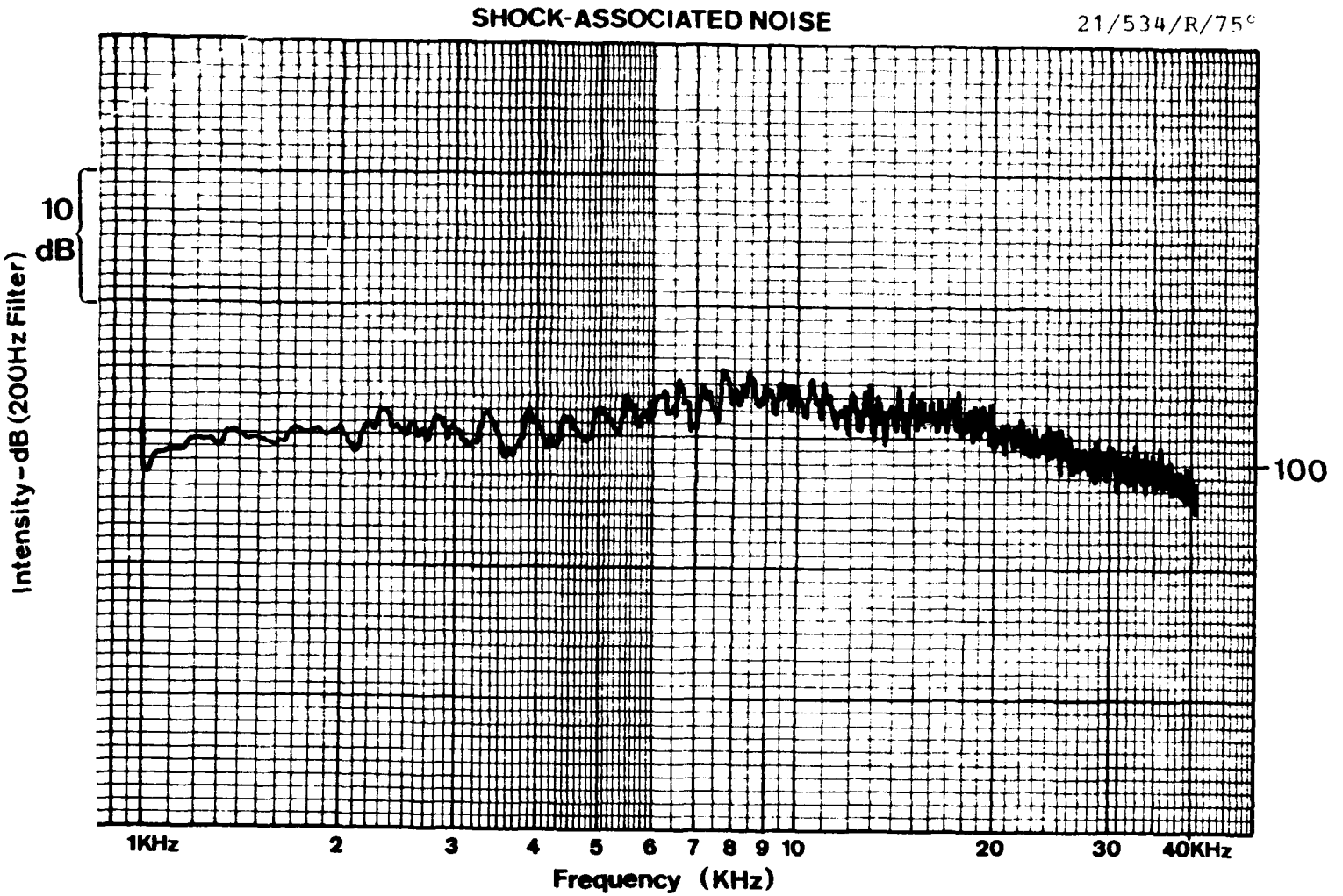
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
21/534/R/75°
10
dB
Intensity - dB (200Hz Filter)
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1KHz
2
3
4
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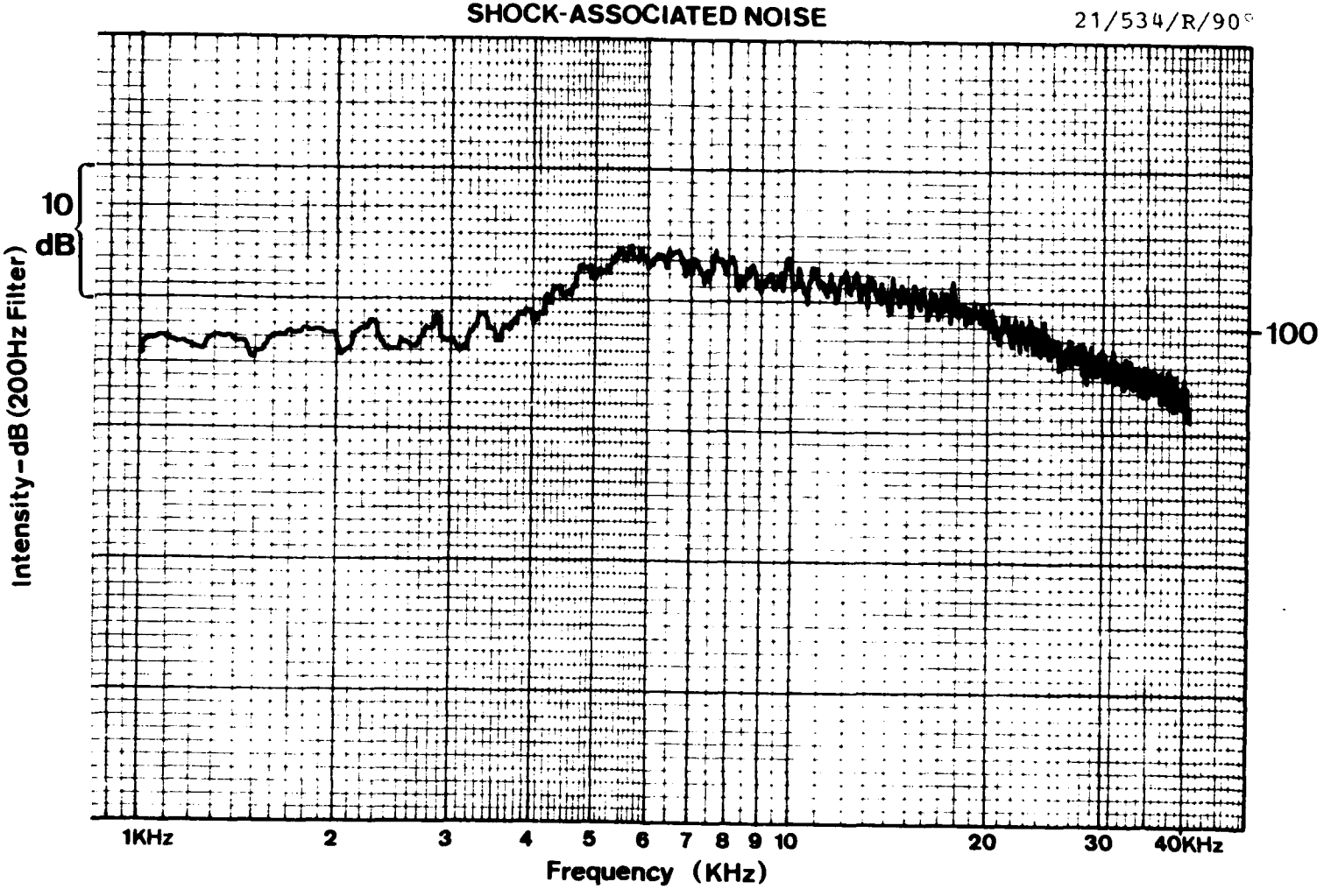
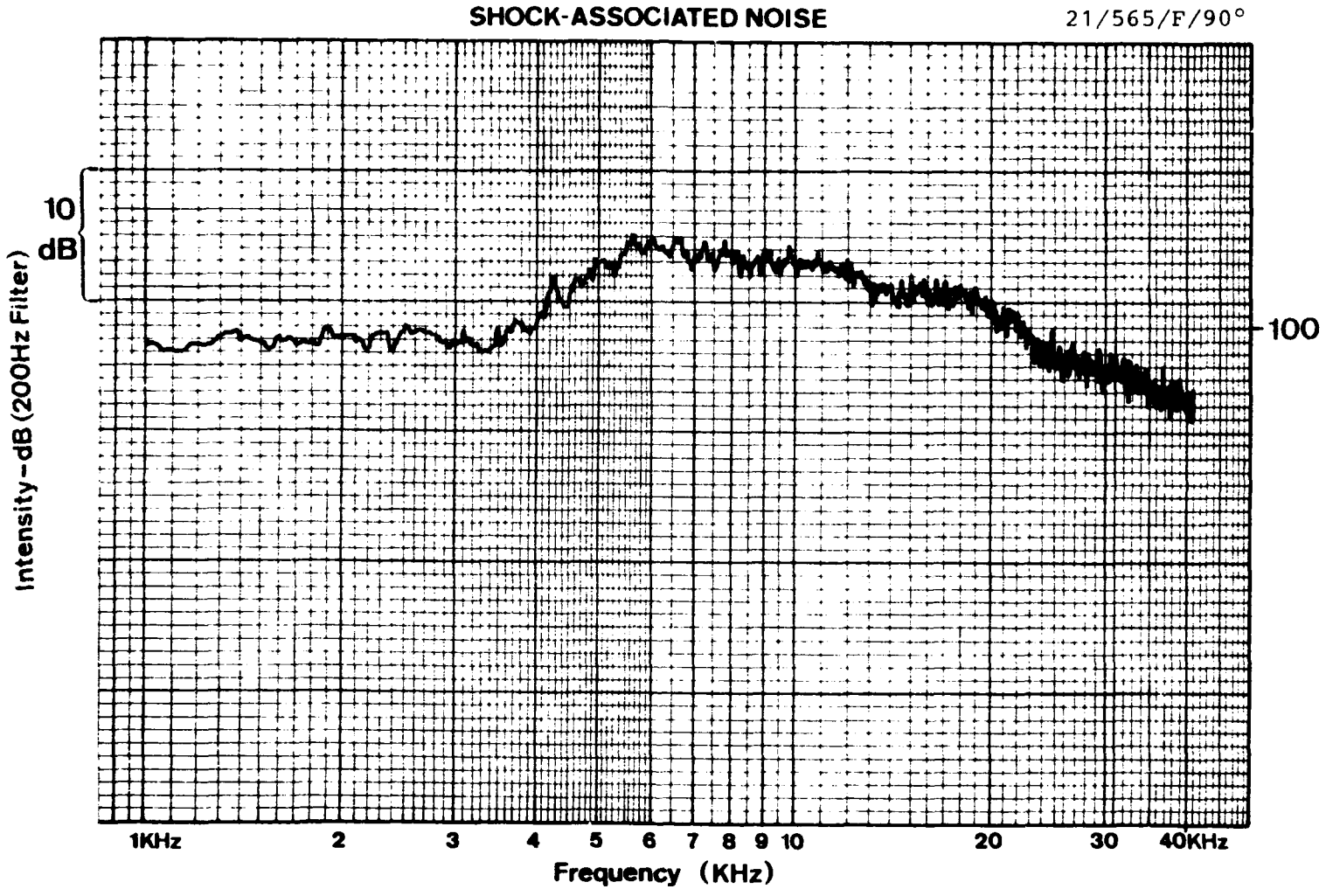
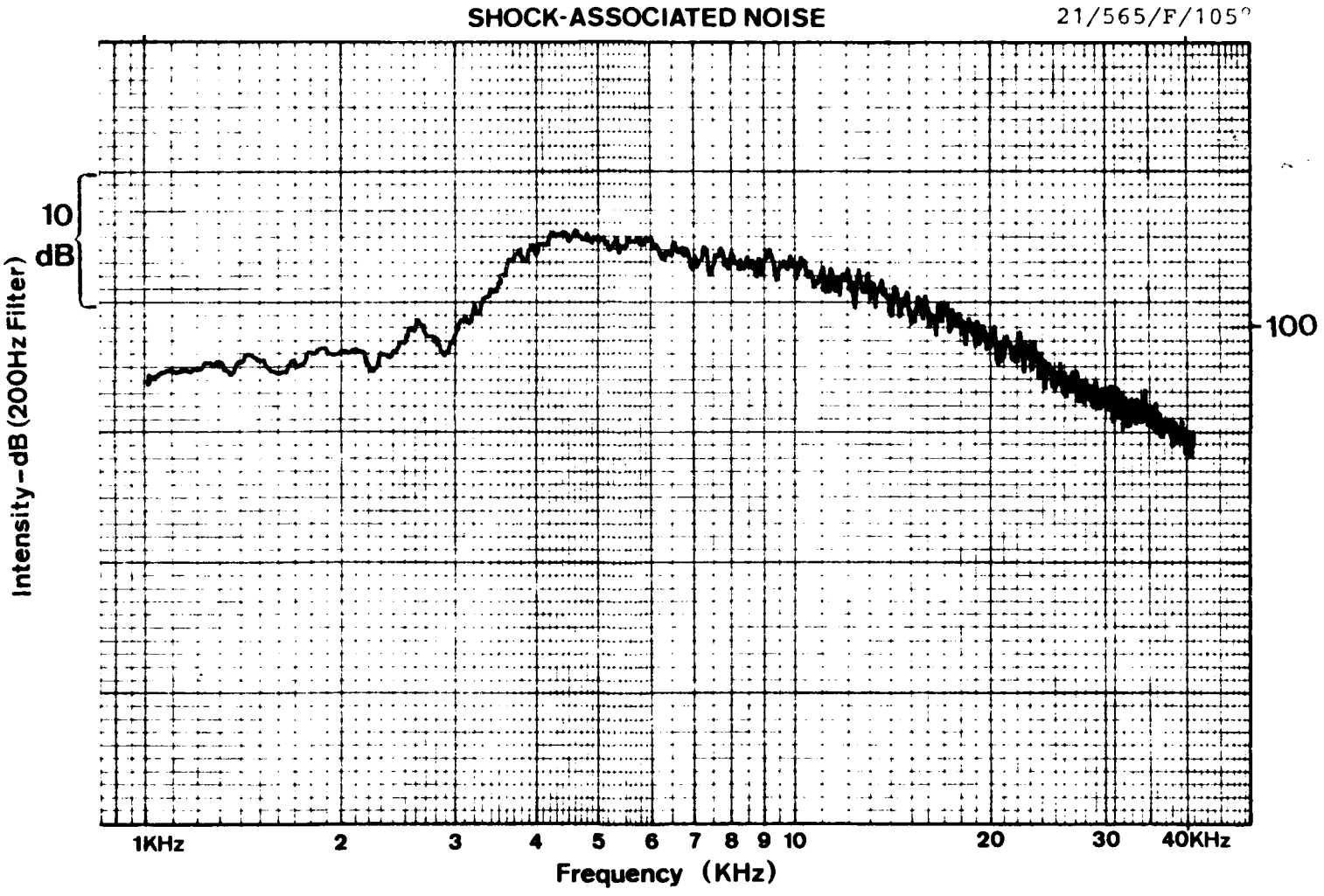
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
21/534/R/90°
10
dB
Intensity-dB (200Hz Filter)
100
1KHz
2
3
4
5
6
7
8
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
21/565/F/90°
10
dB
Intensity-dB (200Hz Filter)
100
1KHz
2
3
4
5
6
7
8
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
21/565/F/105
10
dB
Intensity-dB (200Hz Filter)
100
1KHz
2
3
4
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6
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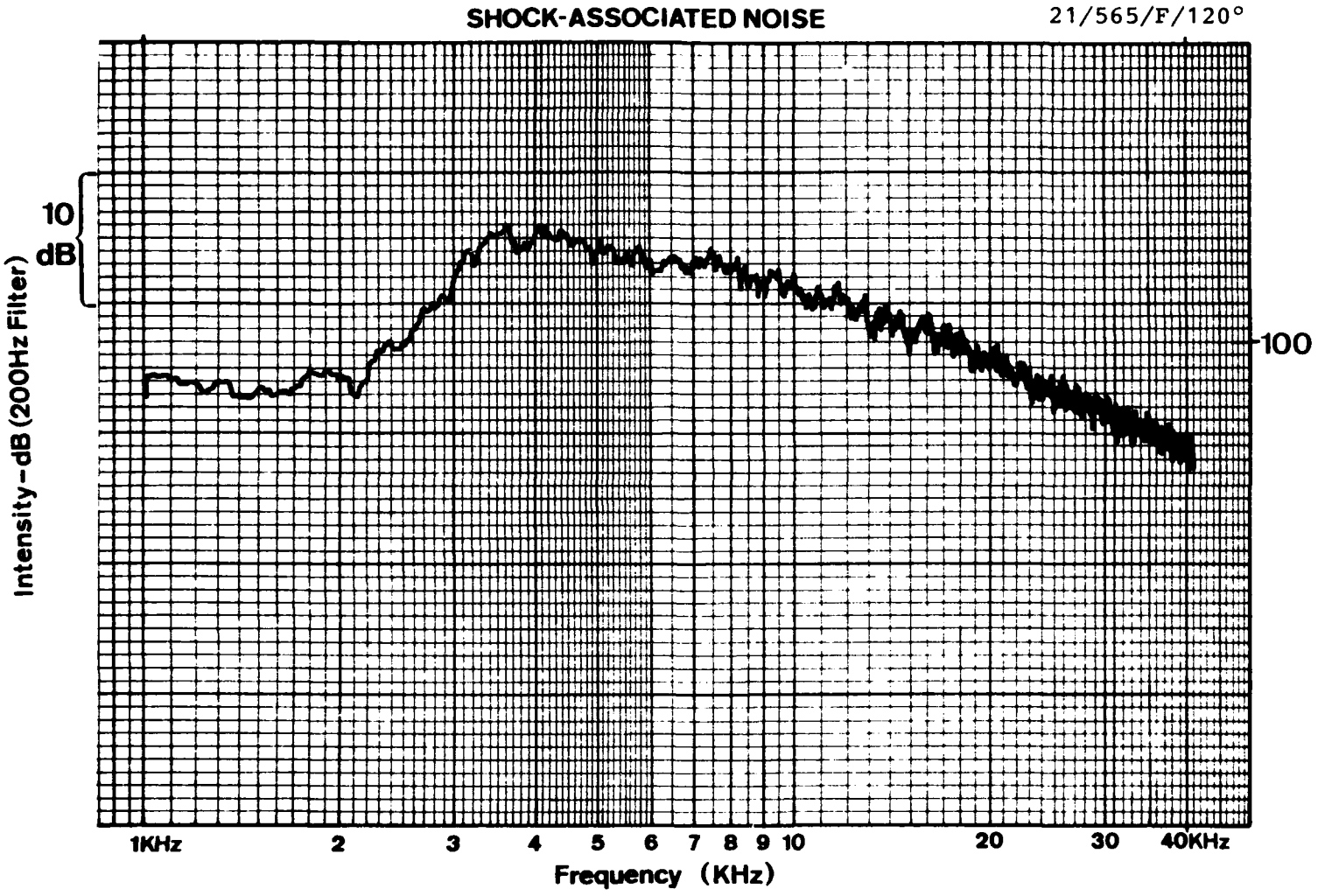
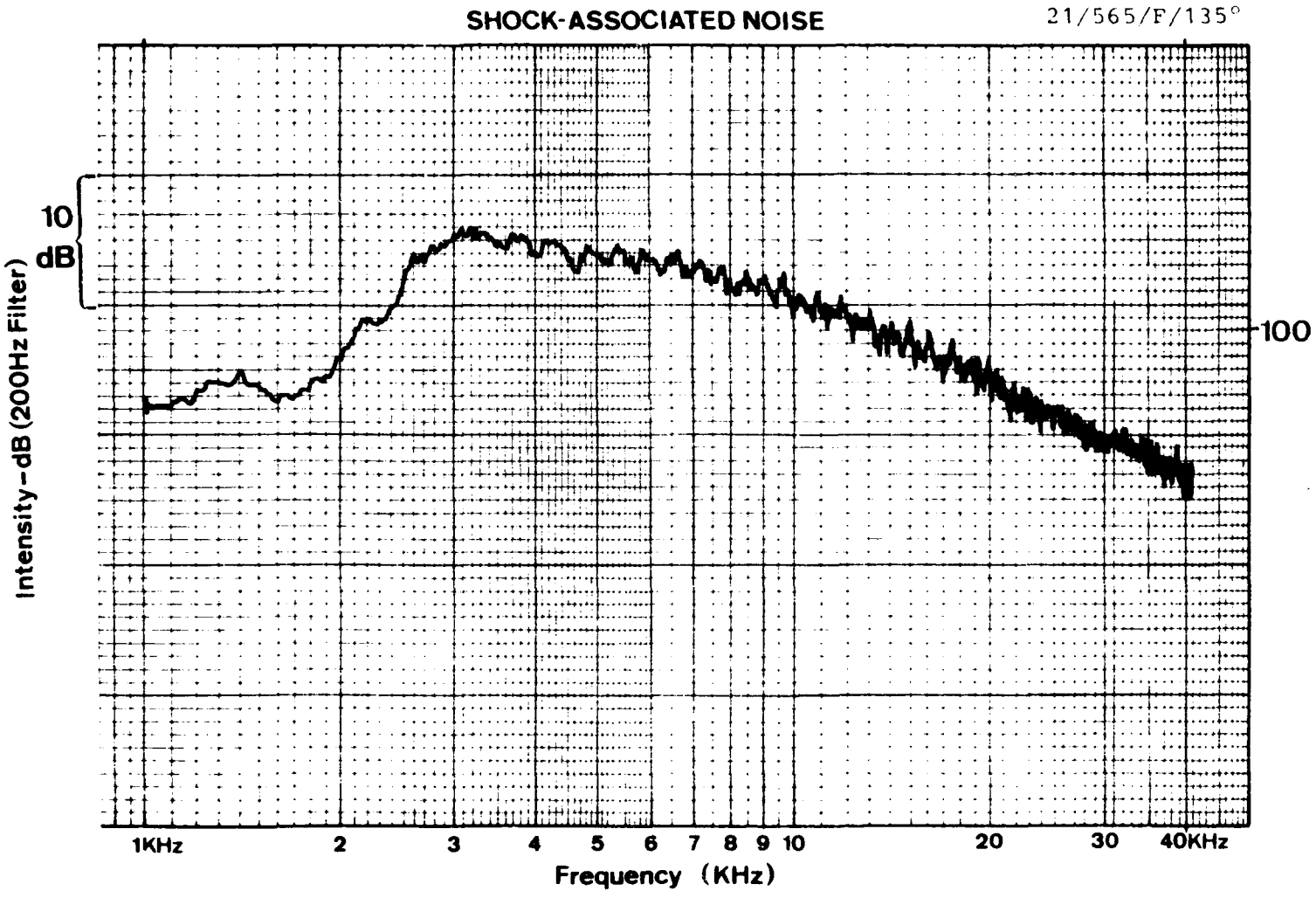
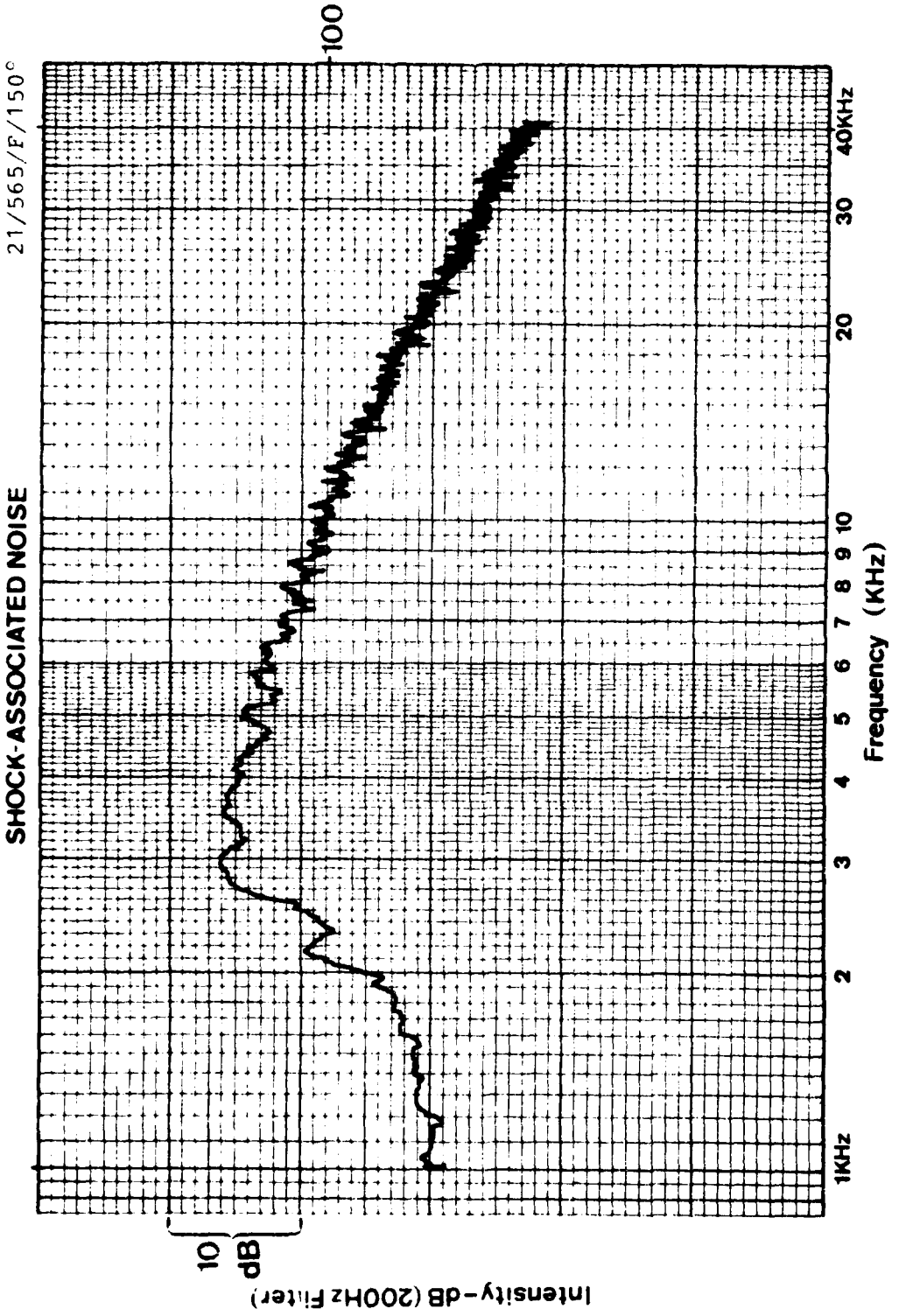
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
21/565/F/120°
10
dB
Intensity-dB (200Hz Filter)
100
1KHz
2
3
4
5
6
7
8
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
21/565/F/135°
10
dB
Intensity-dB (200Hz Filter)
100
1KHz
2
3
4
5
6
7
8
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
21/565/F/150°
100
10 dB
Intensity – dB (200Hz Filter)
1KHz
2
3
4
5
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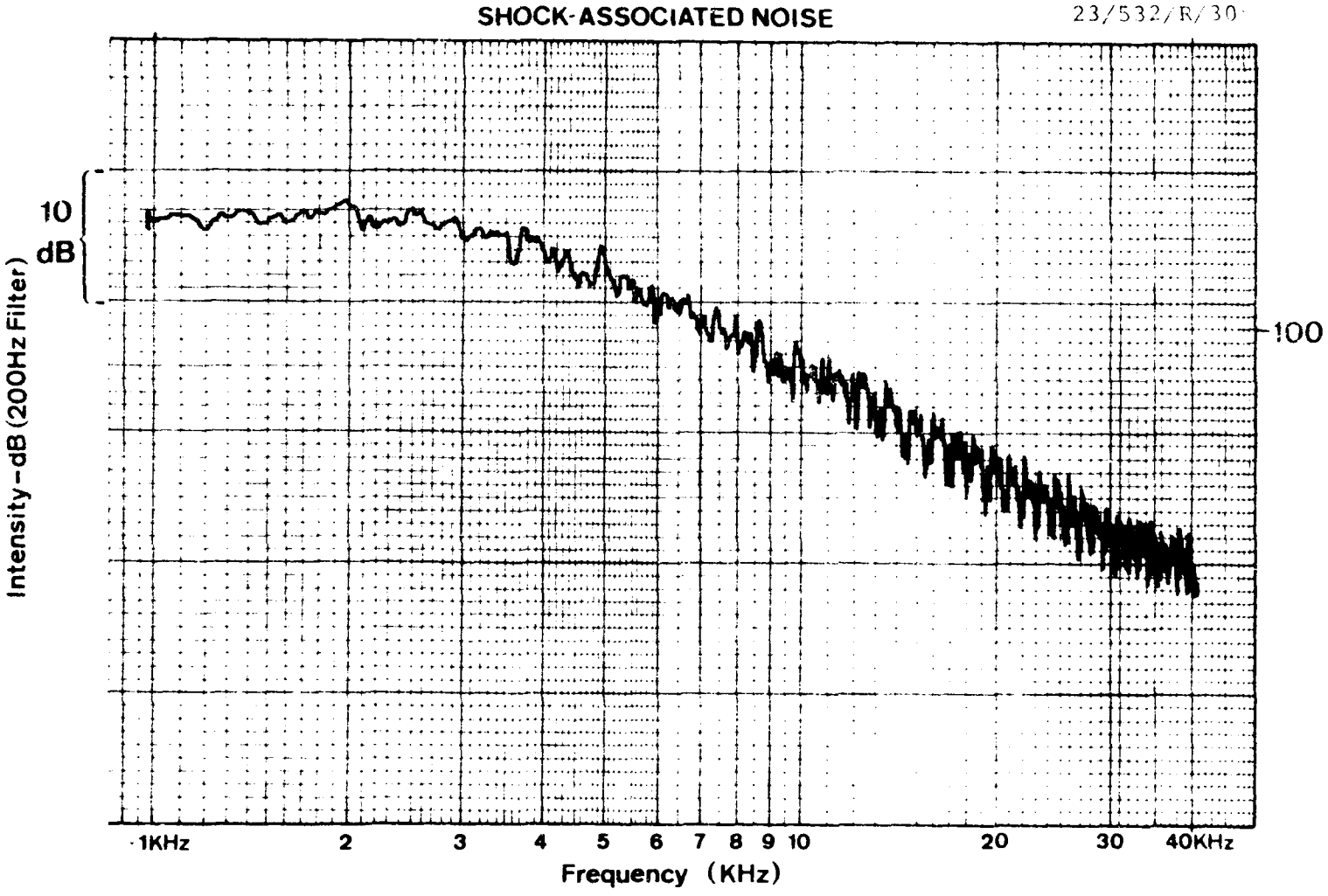
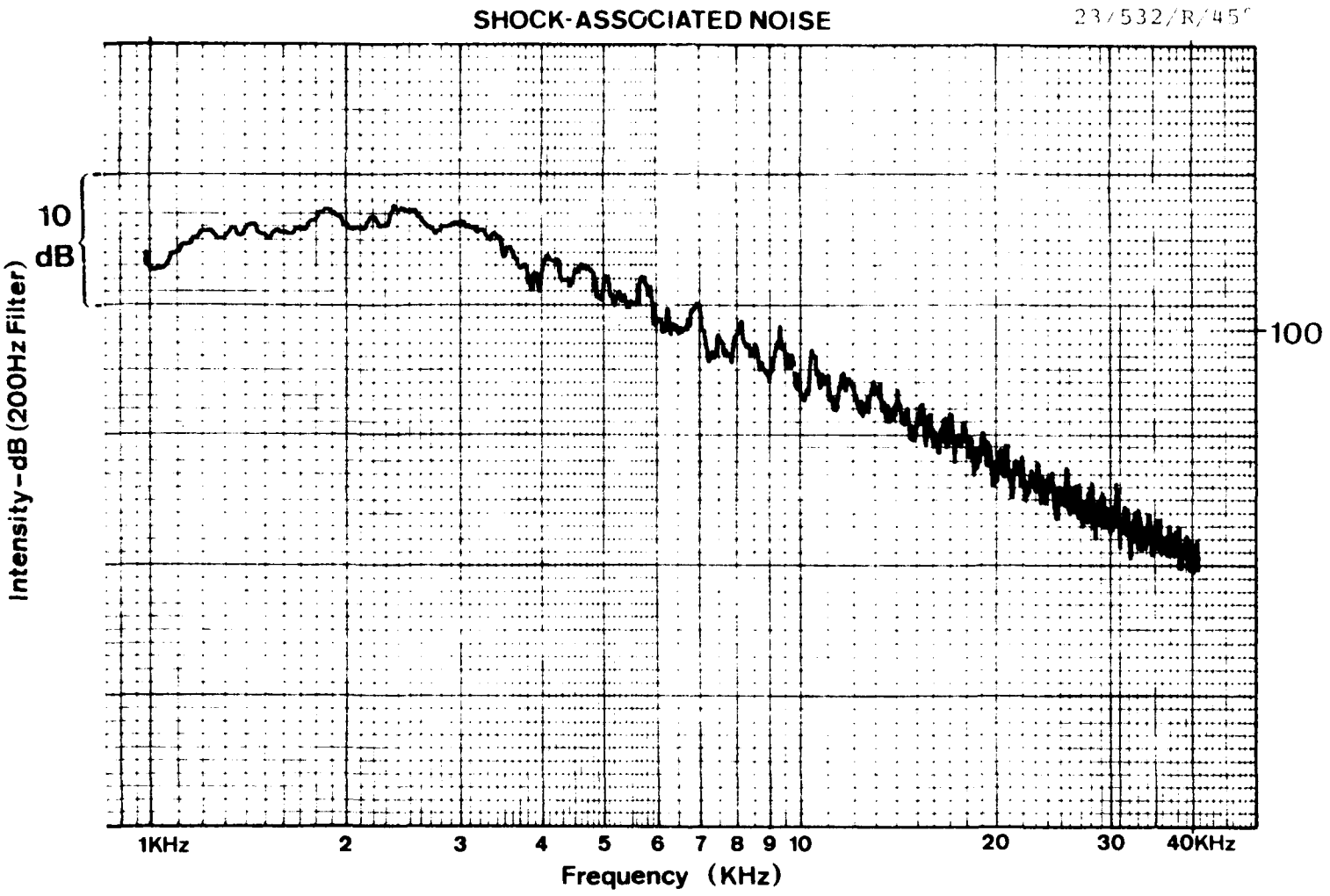
8
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
23/532/R/30
10
dB
Intensity-dB (200Hz Filter)
100
1KHz
2
3
4
5
6
7
8
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
23/532/R/45°
10
dB
Intensity-dB (200Hz Filter)
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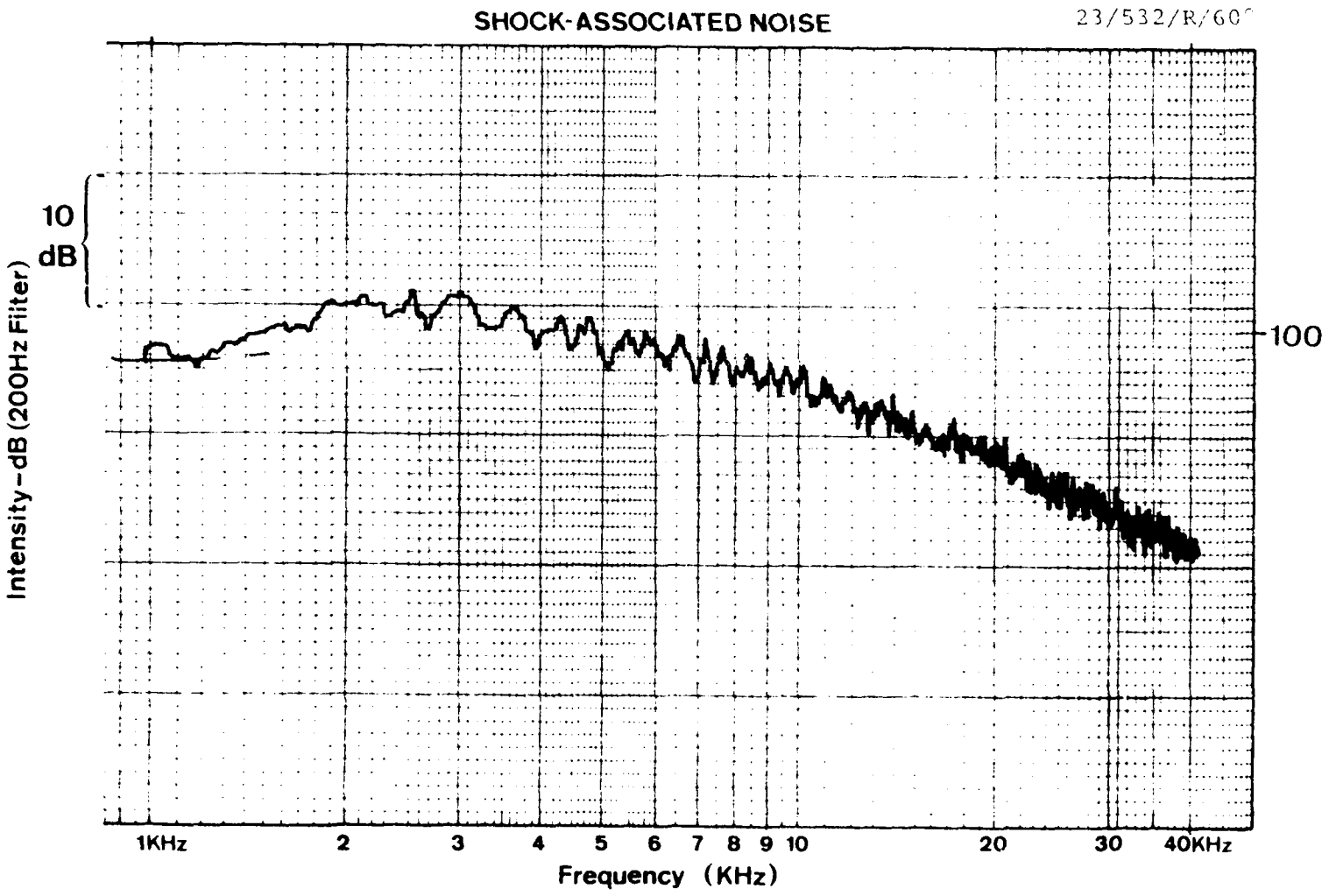
1KHz
2
3
4
5
6
7
8
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
23/532/R/60°
10
dB
Intensity-dB (200Hz Filter)
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1KHz
2
3
4
5
6
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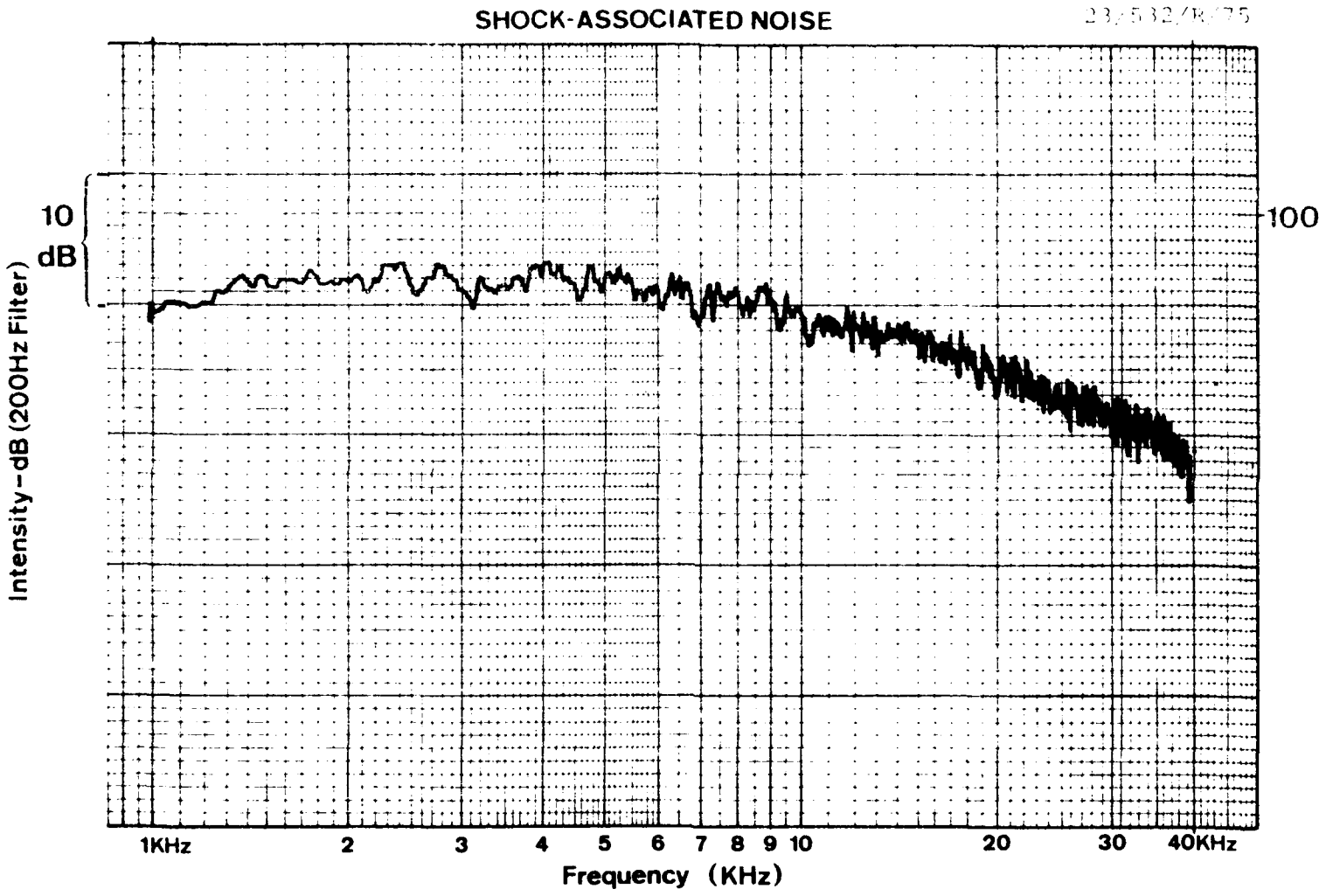
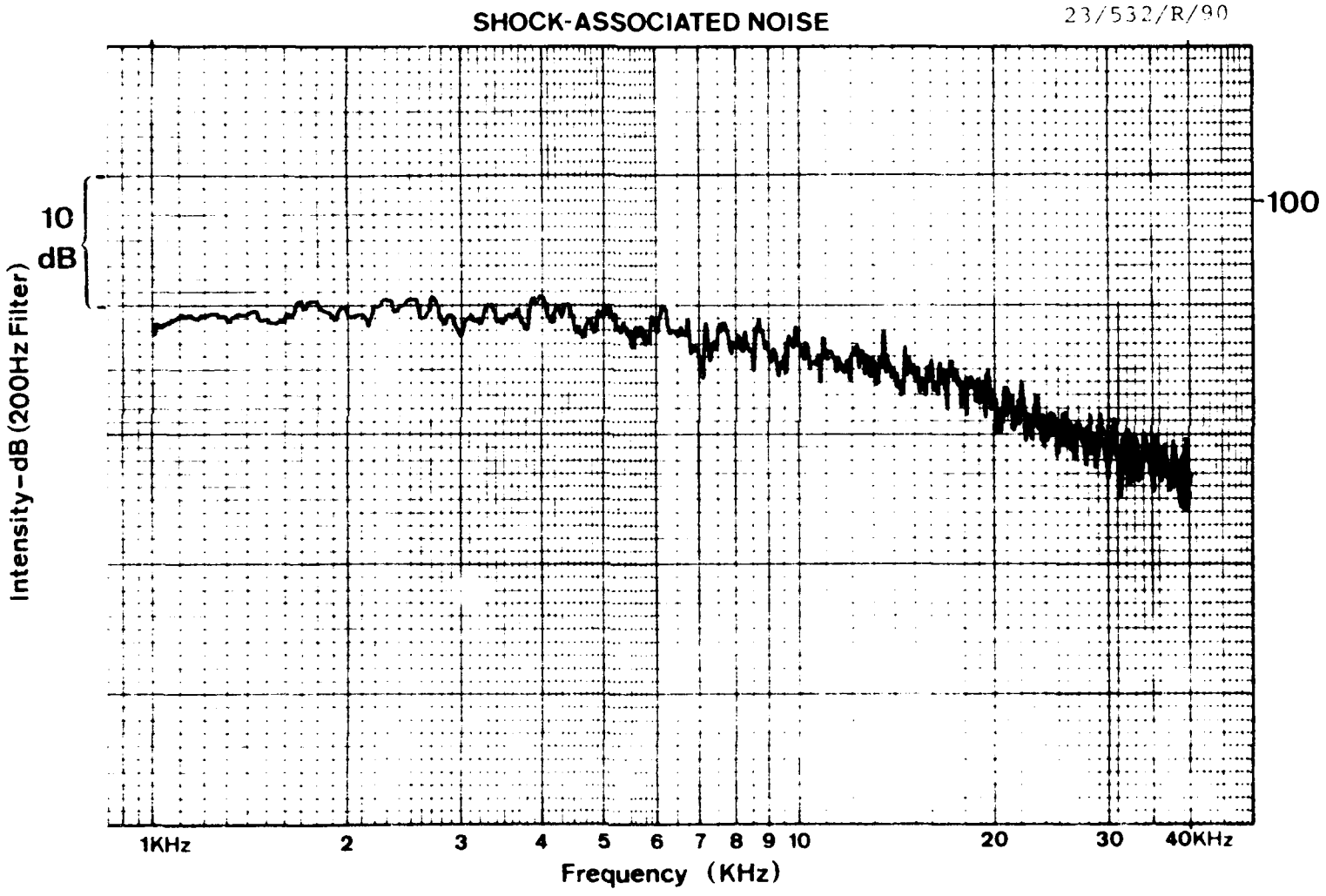
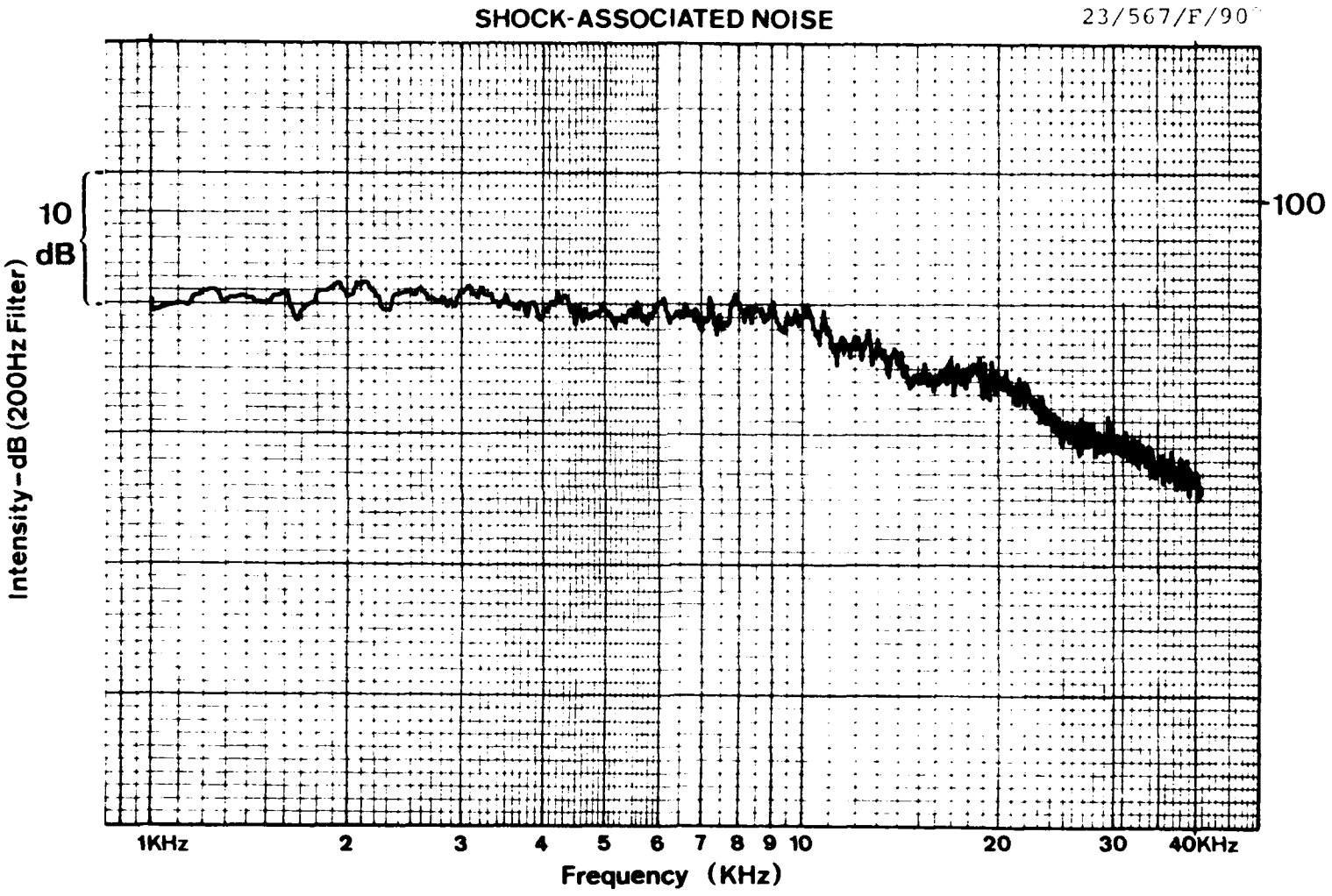
8
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
10
dB
100
Intensity-dB (200Hz Filter)
1KHz
2
3
4
5
6
7
8
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
23/532/R/90
10
dB
100
Intensity-dB (200Hz Filter)
1KHz
2
3
4
5
6
7
8
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
23/567/F/90
10 dB
100
Intensity-dB (200Hz Filter)
1KHz
2
3
4
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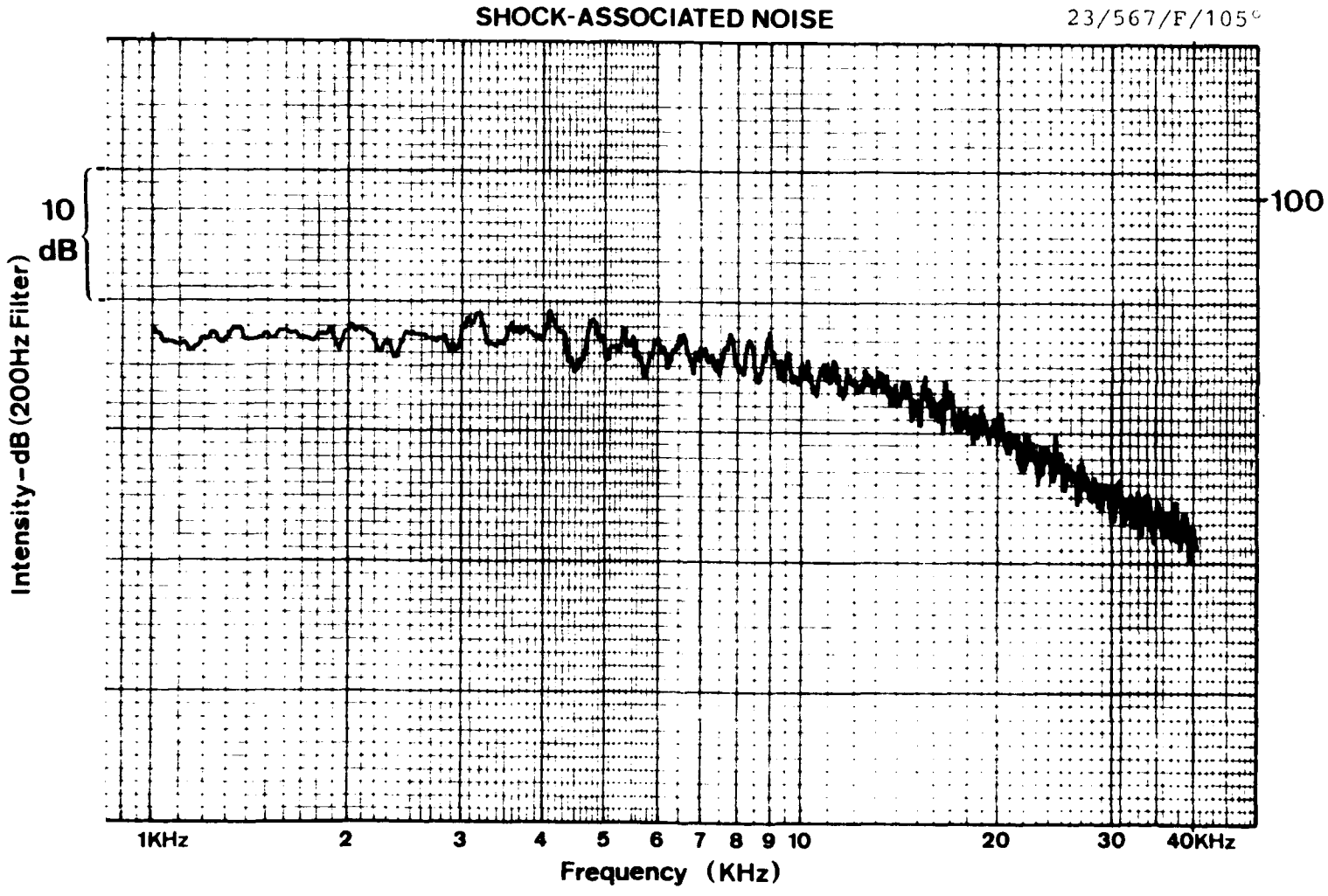
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
23/567/F/105
10
dB
100
Intensity-dB (200Hz Filter)
1KHz
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9
10
20
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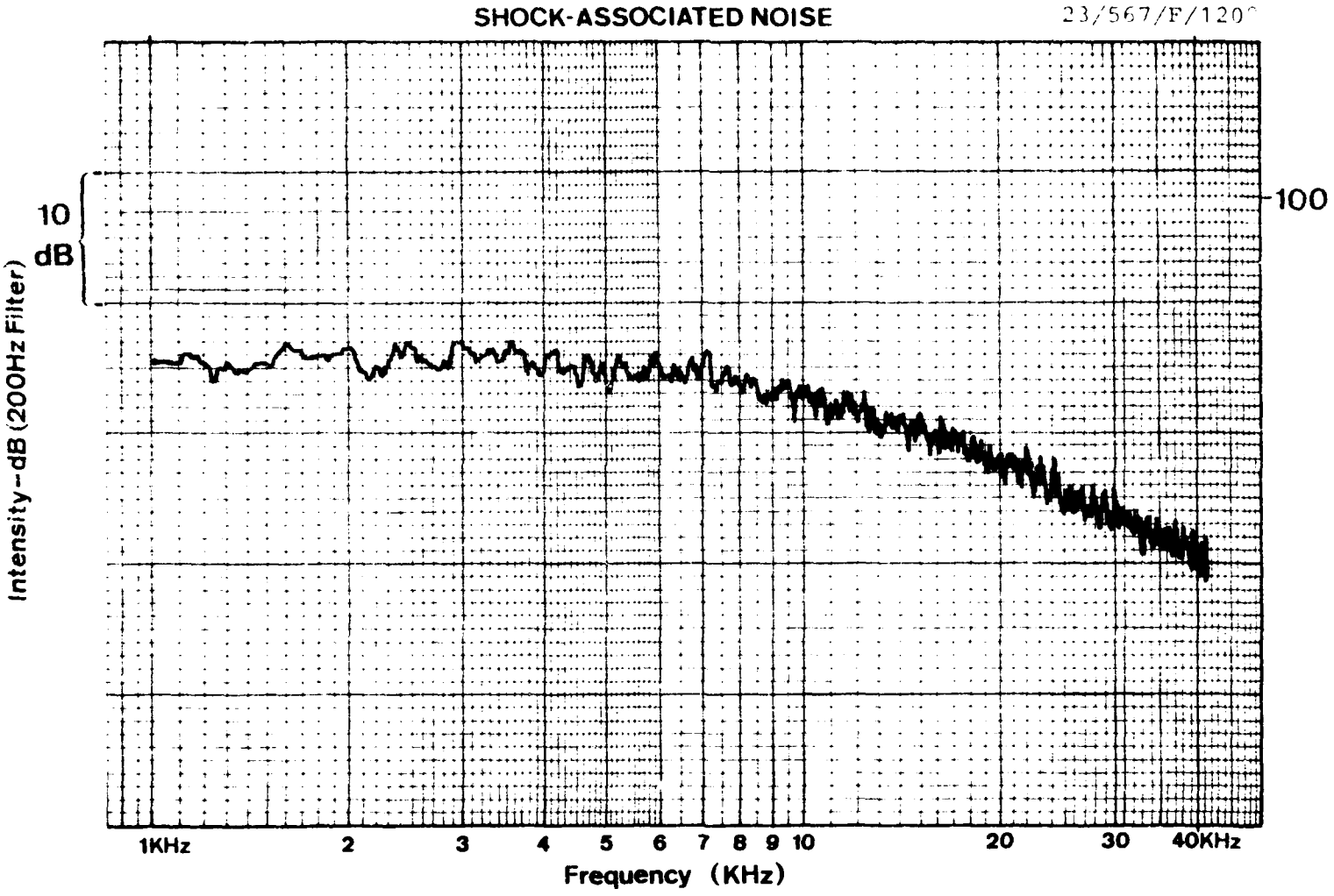
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
23/567/F/120
10
dB
100
Intensity-dB (200Hz Filter)
1KHz
2
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4
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6
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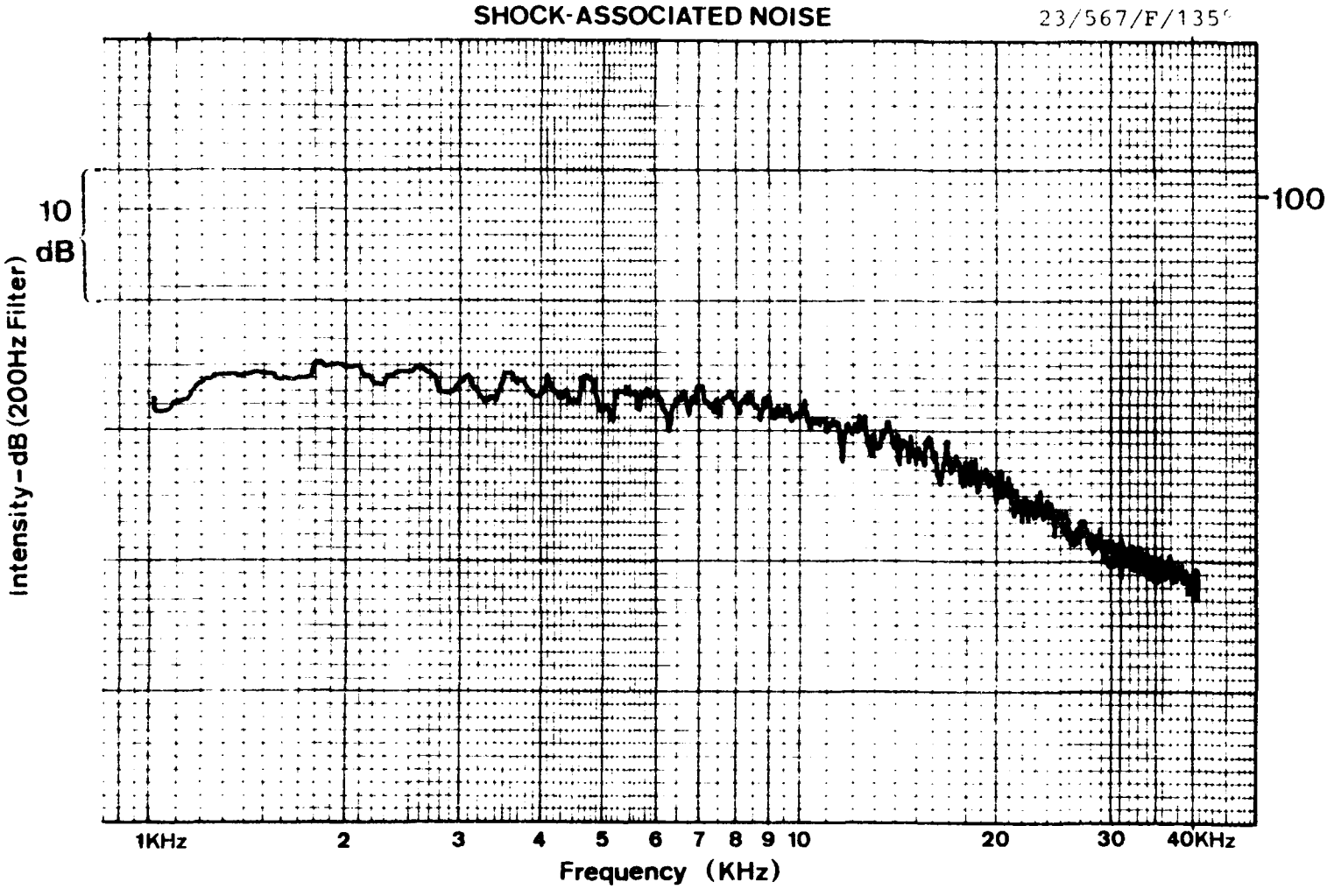
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
23/567/F/135
10
dB
100
Intensity-dB (200Hz Filter)
1KHz
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9
10
20
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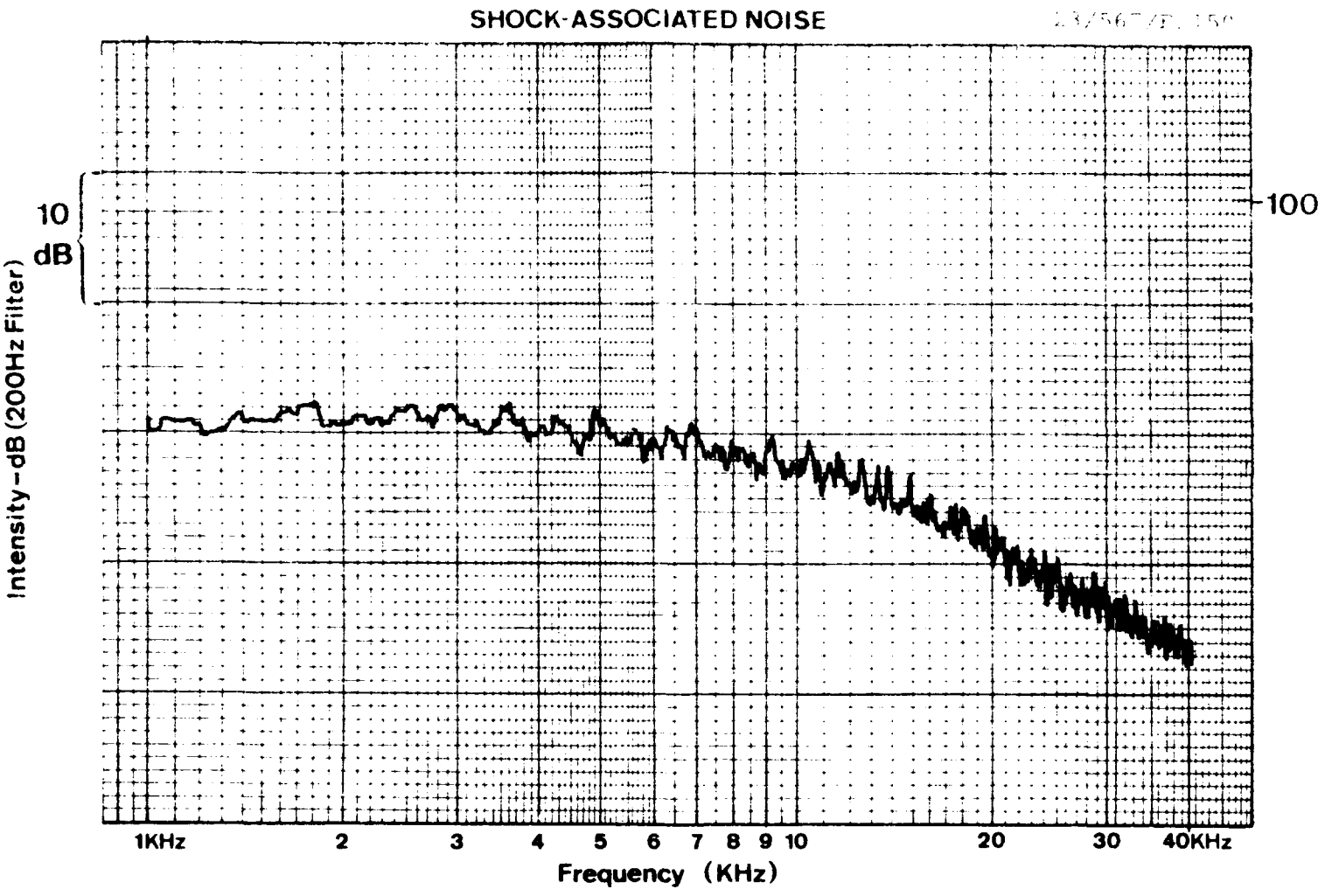
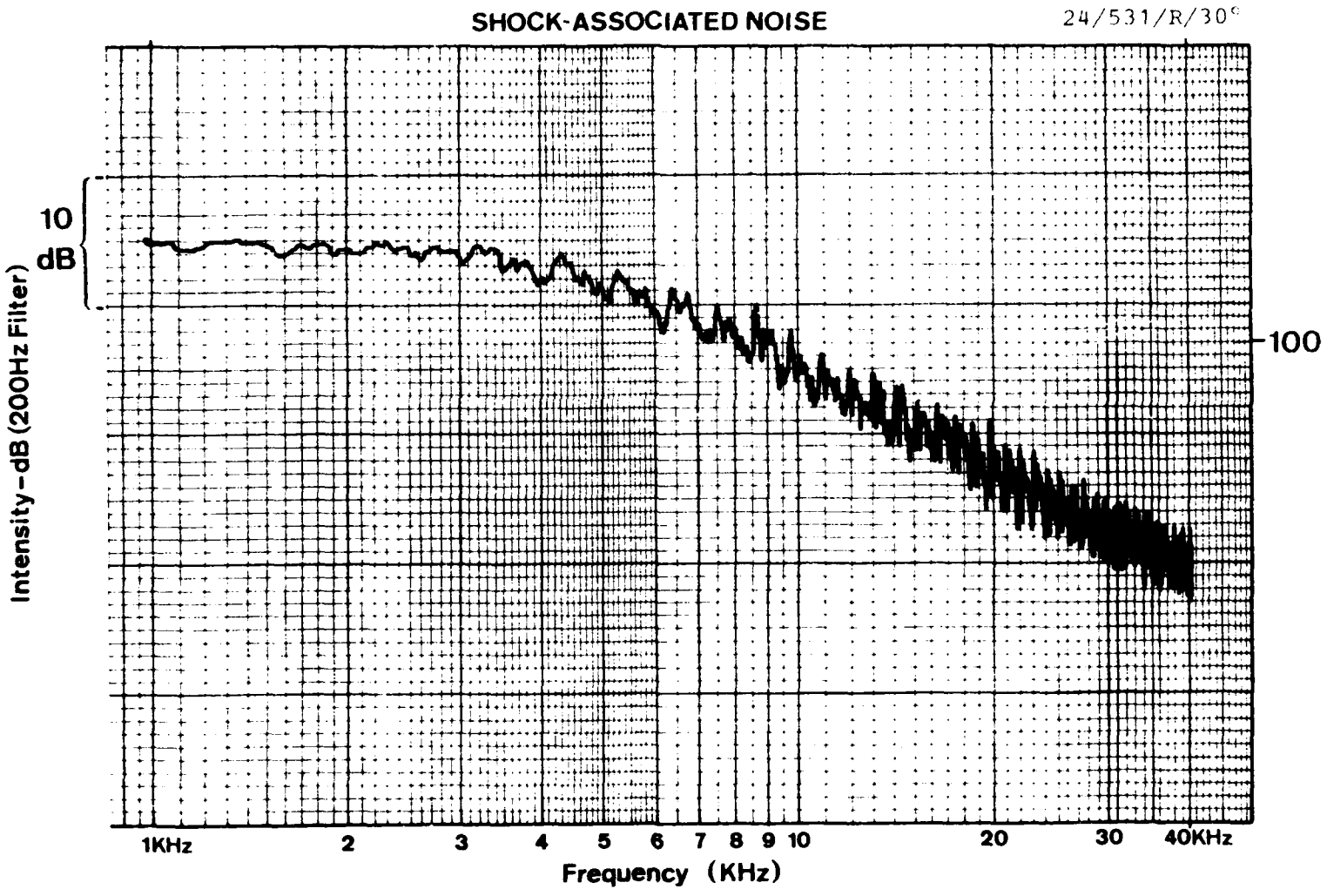
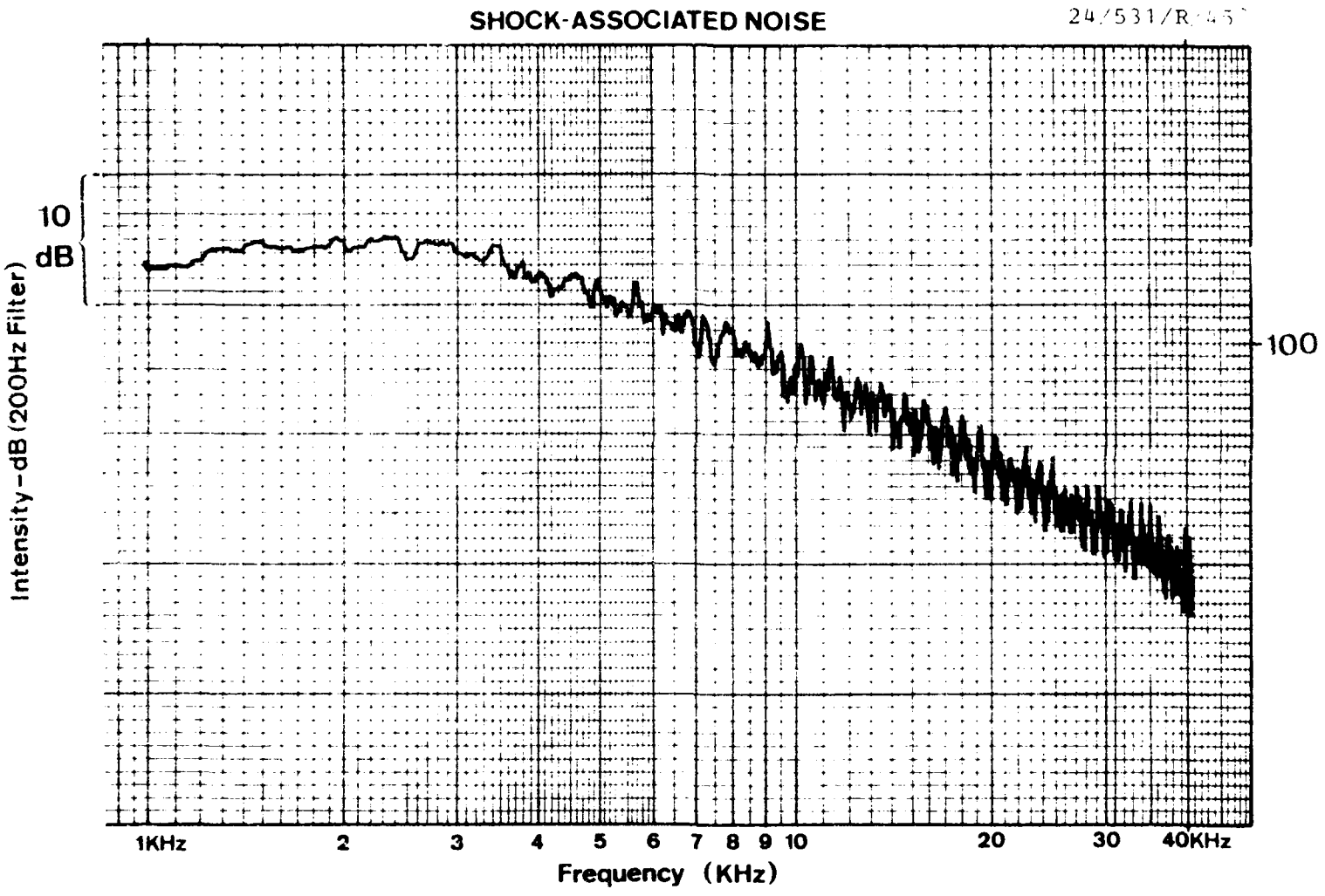
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
10
dB
100
Intensity-dB (200Hz Filter)
1KHz
2
3
4
5
6
7
8
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
24/531/R/30°
10
dB
Intensity-dB (200Hz Filter)
100
1KHz
2
3
4
5
6
7
8
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
24/531/R/45
10
dB
Intensity – dB (200Hz Filter)
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1KHz
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9
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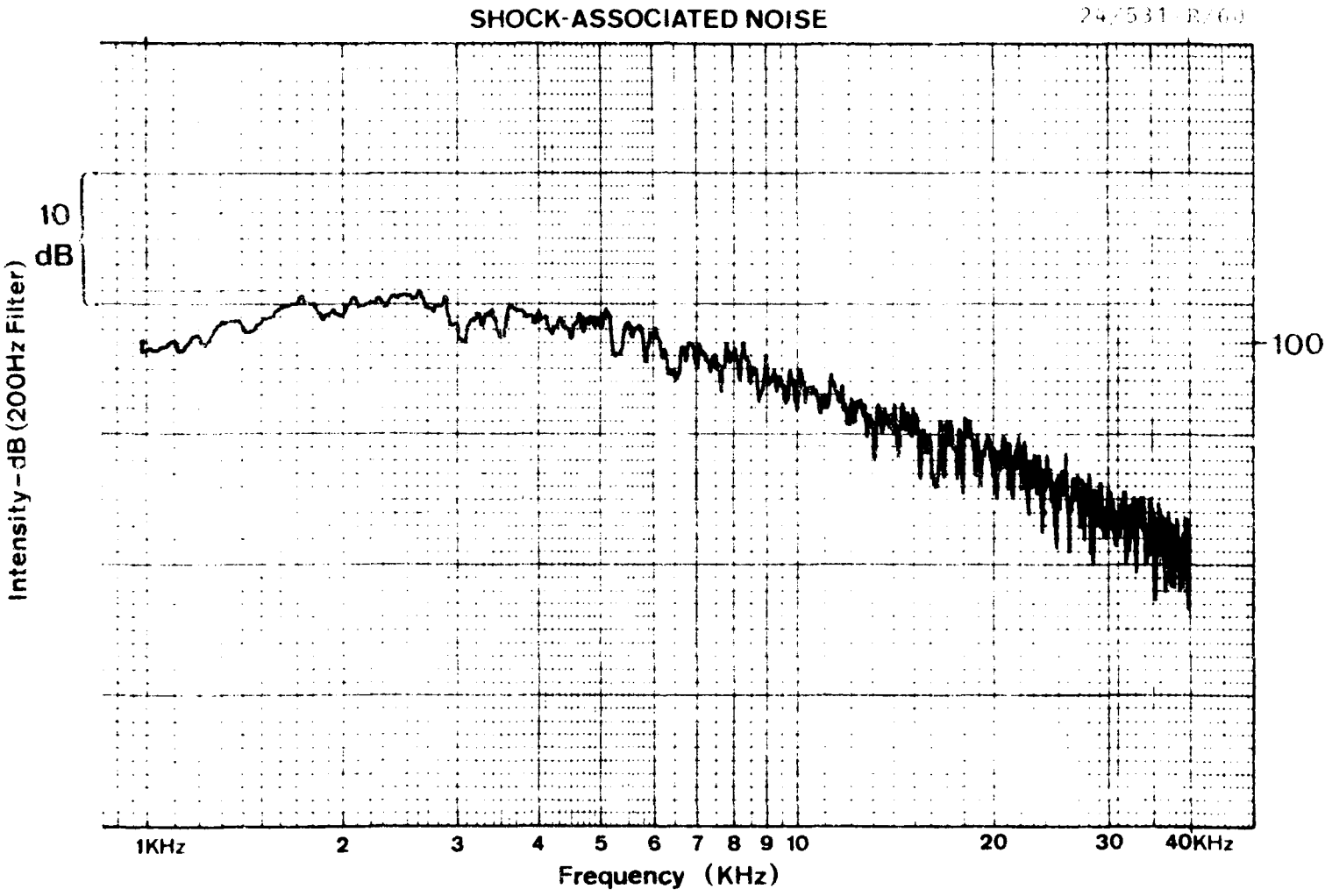
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
24/531 R/60
10
dB
Intensity-dB (200Hz Filter)
100
1KHz
2
3
4
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6
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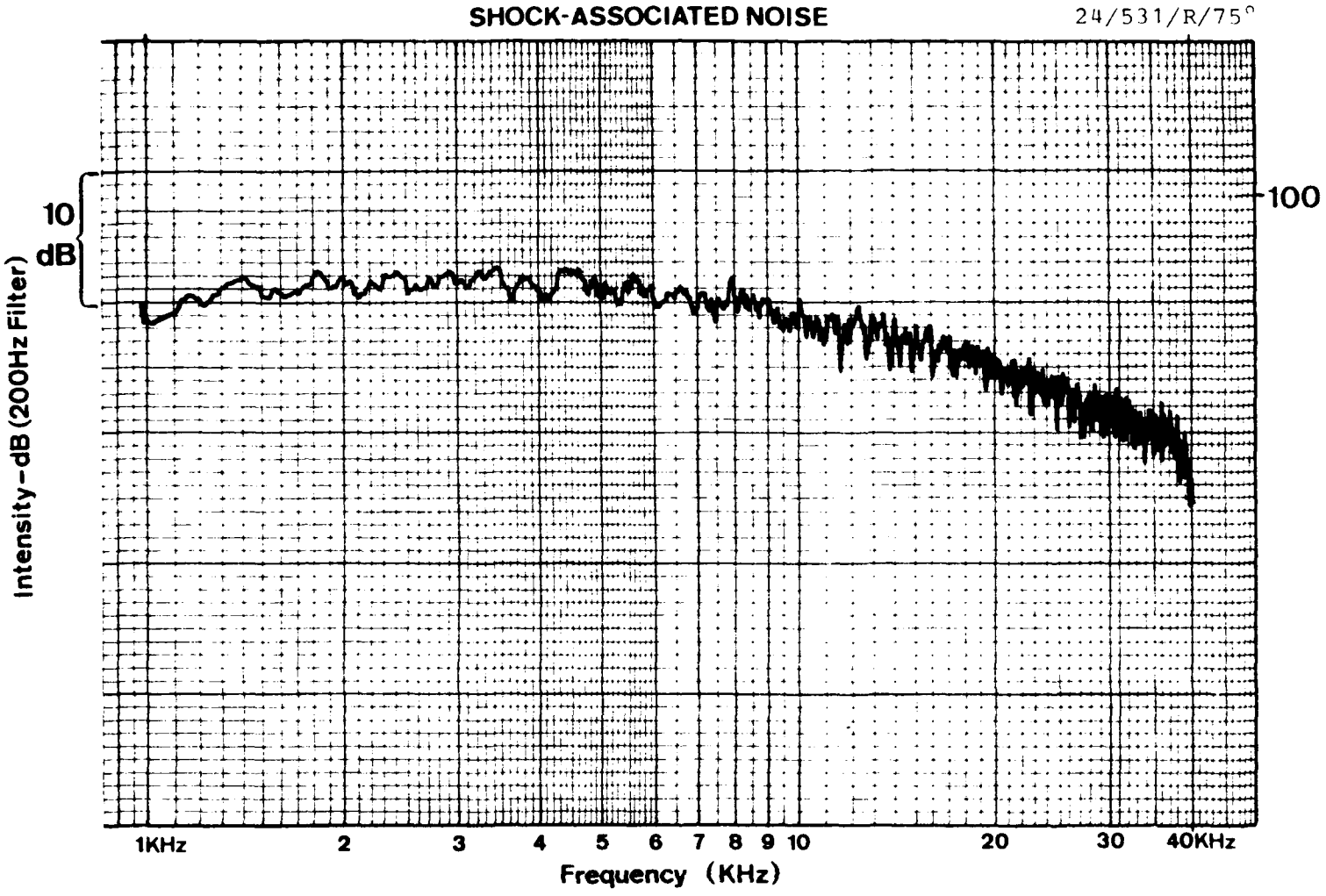
8
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
24/531/R/75°
10
dB
100
Intensity-dB (200Hz Filter)
1KHz
2
3
4
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6
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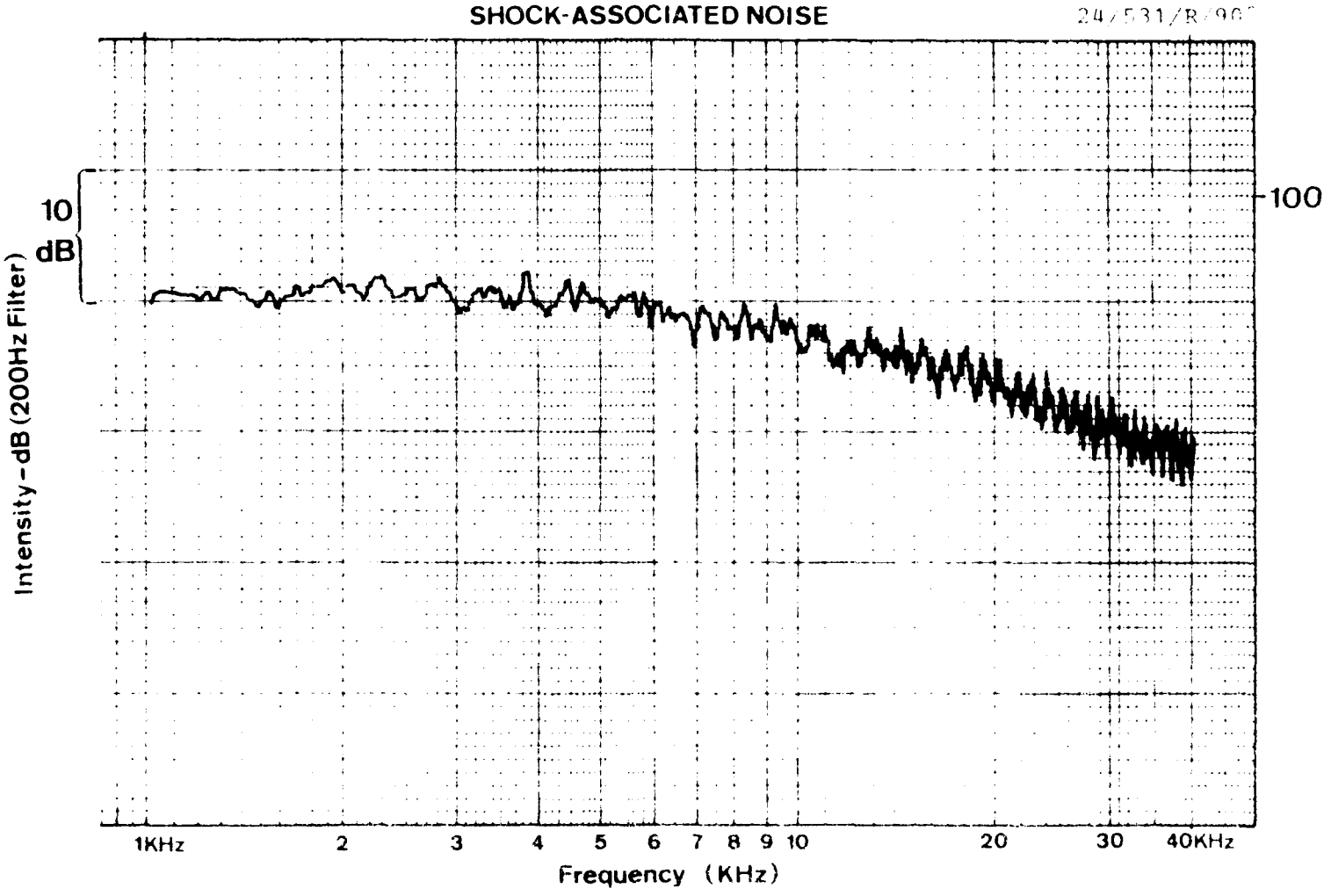
8
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
10
dB
100
Intensity - dB (200Hz Filter)
1KHz
2
3
4
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6
7
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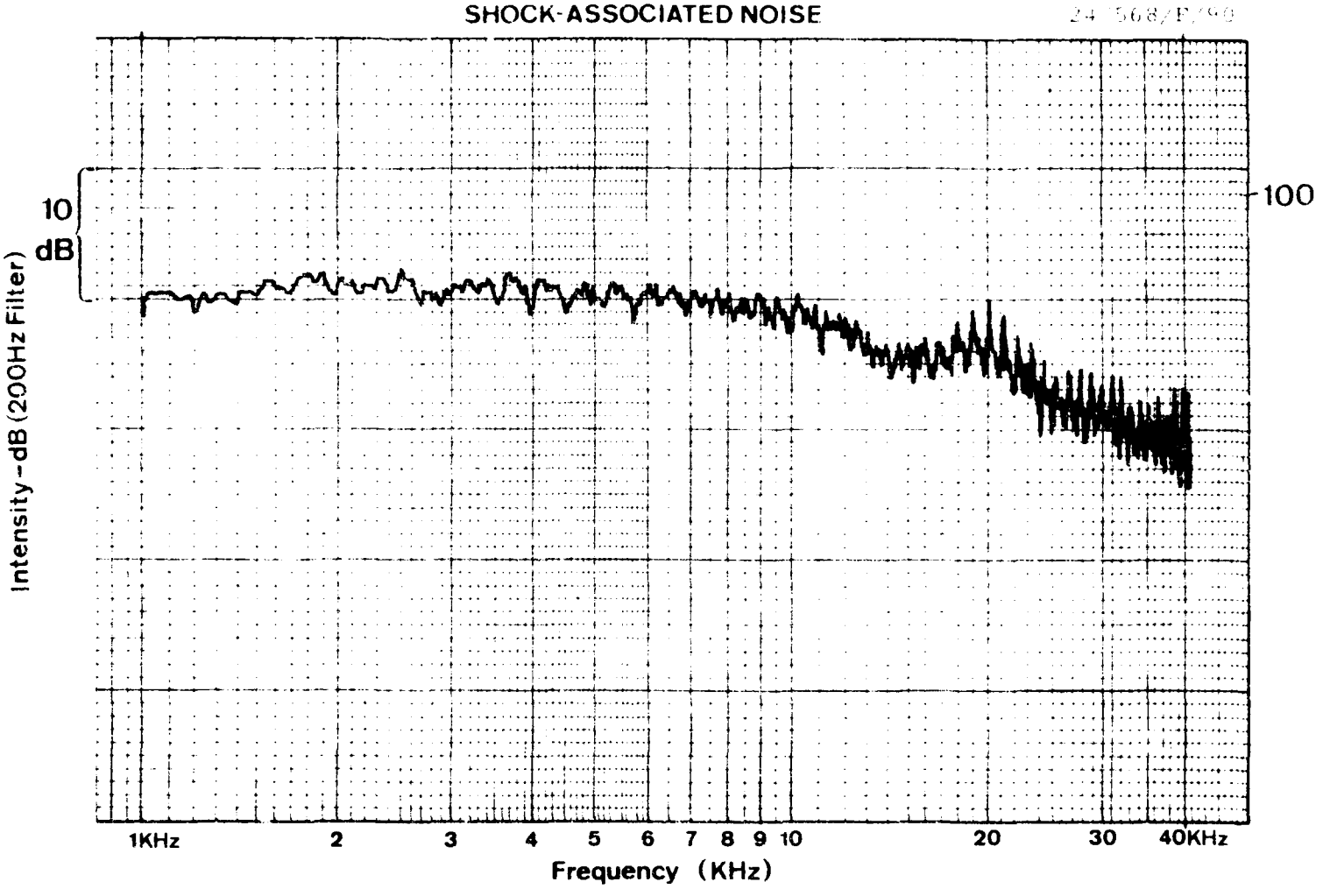
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
24 568/E/90
10
dB
100
Intensity-dB (200Hz Filter)
1KHz
2
3
4
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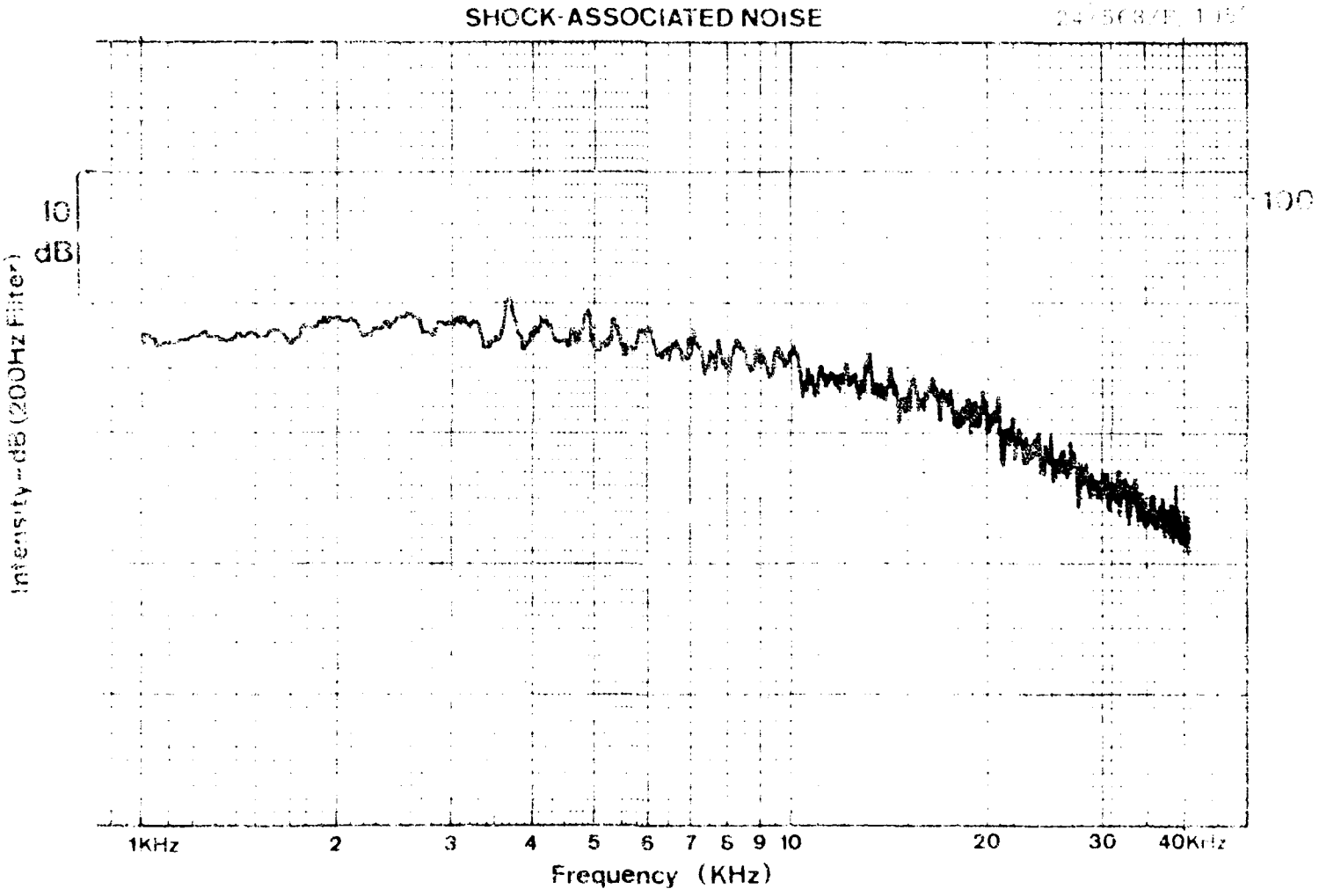
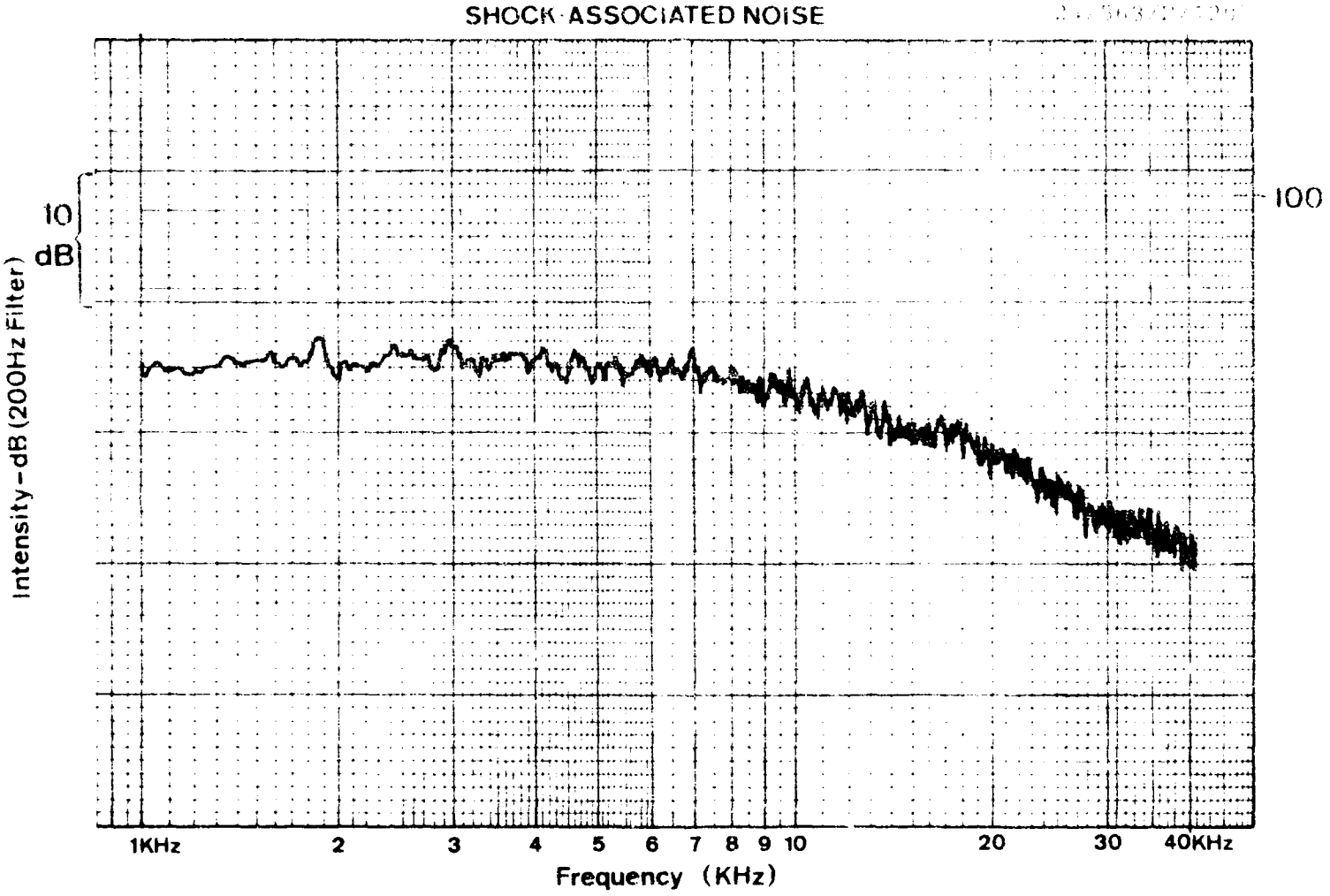
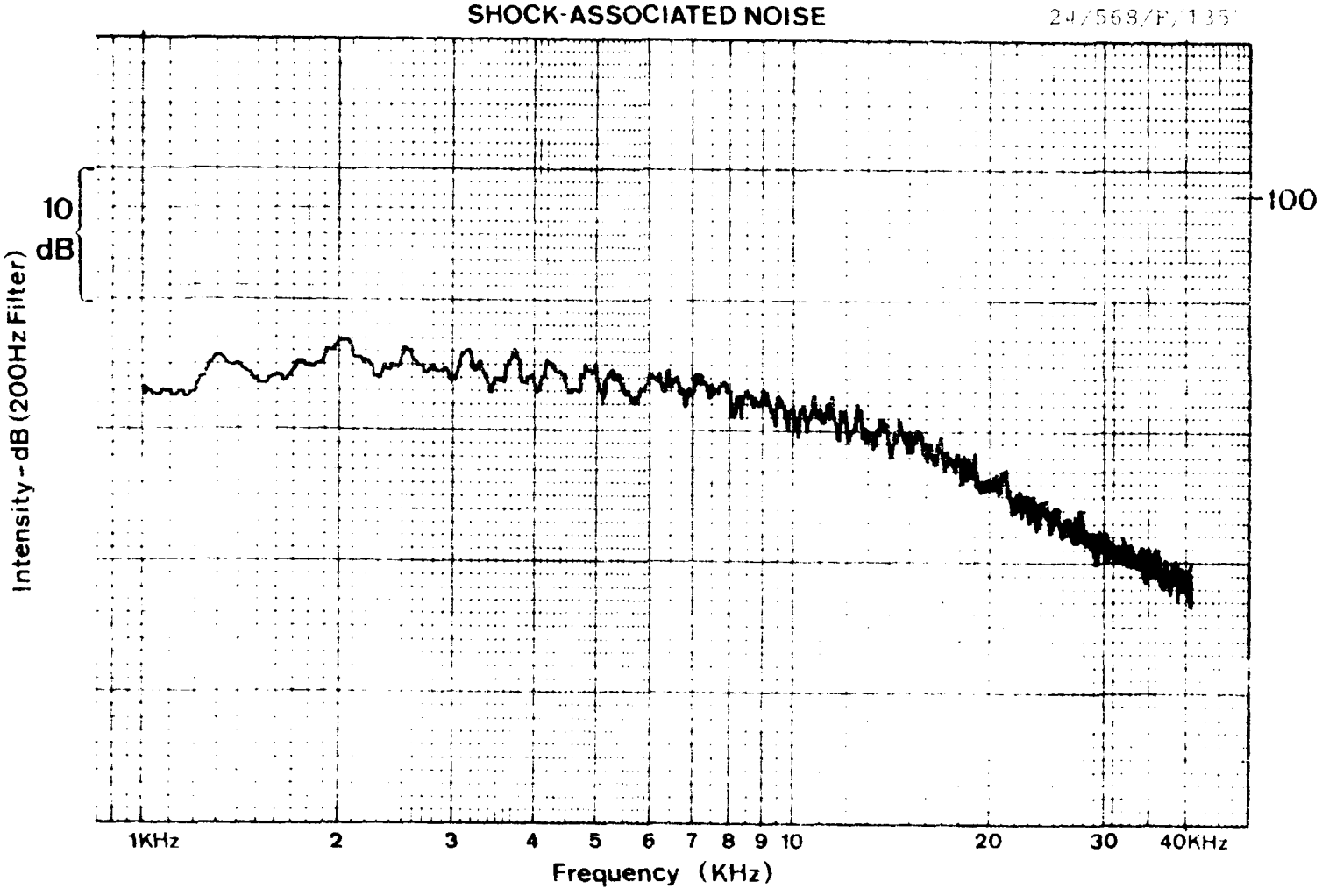
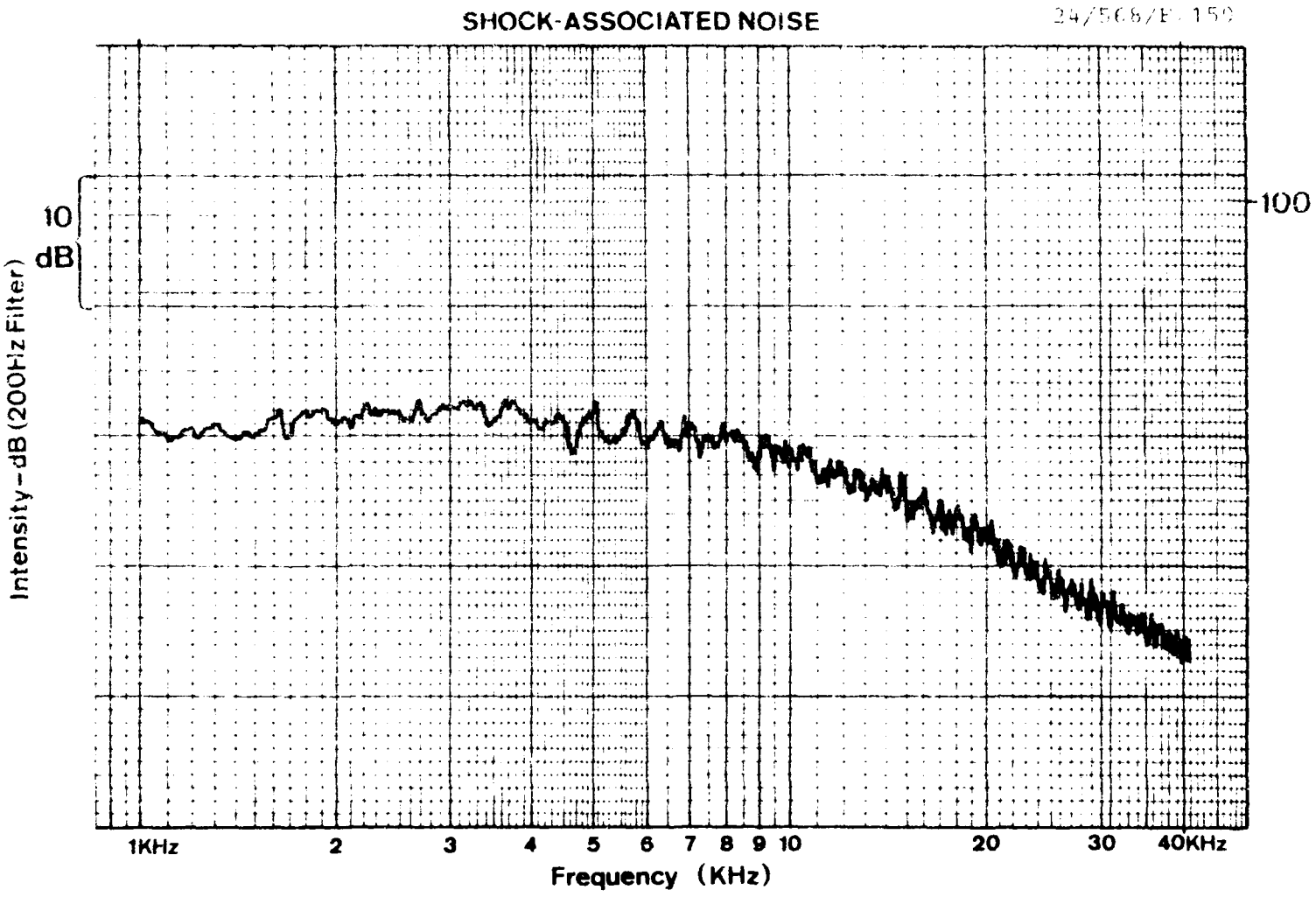
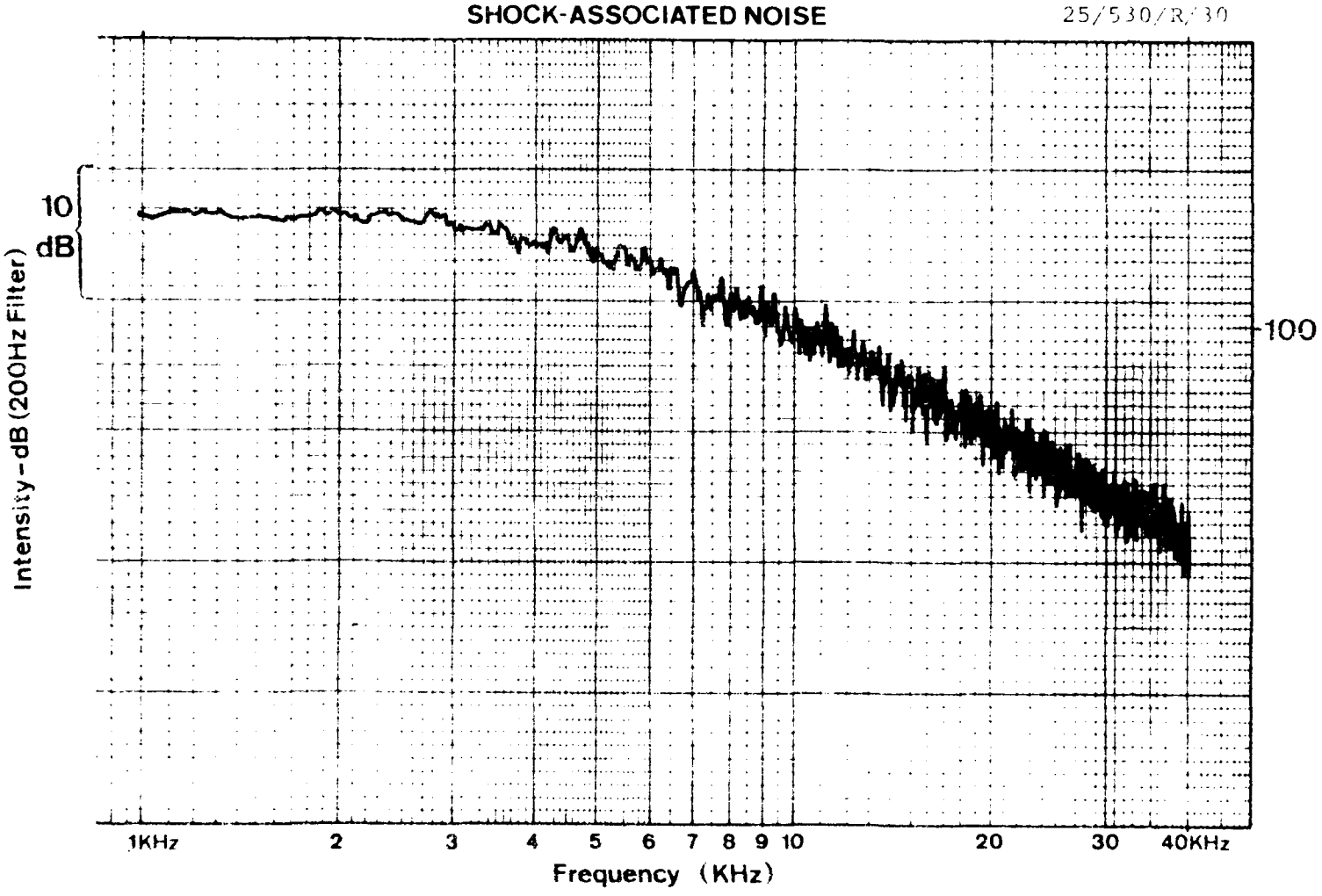
8
9
10
20
30
40KHz
Frequency (KHz)

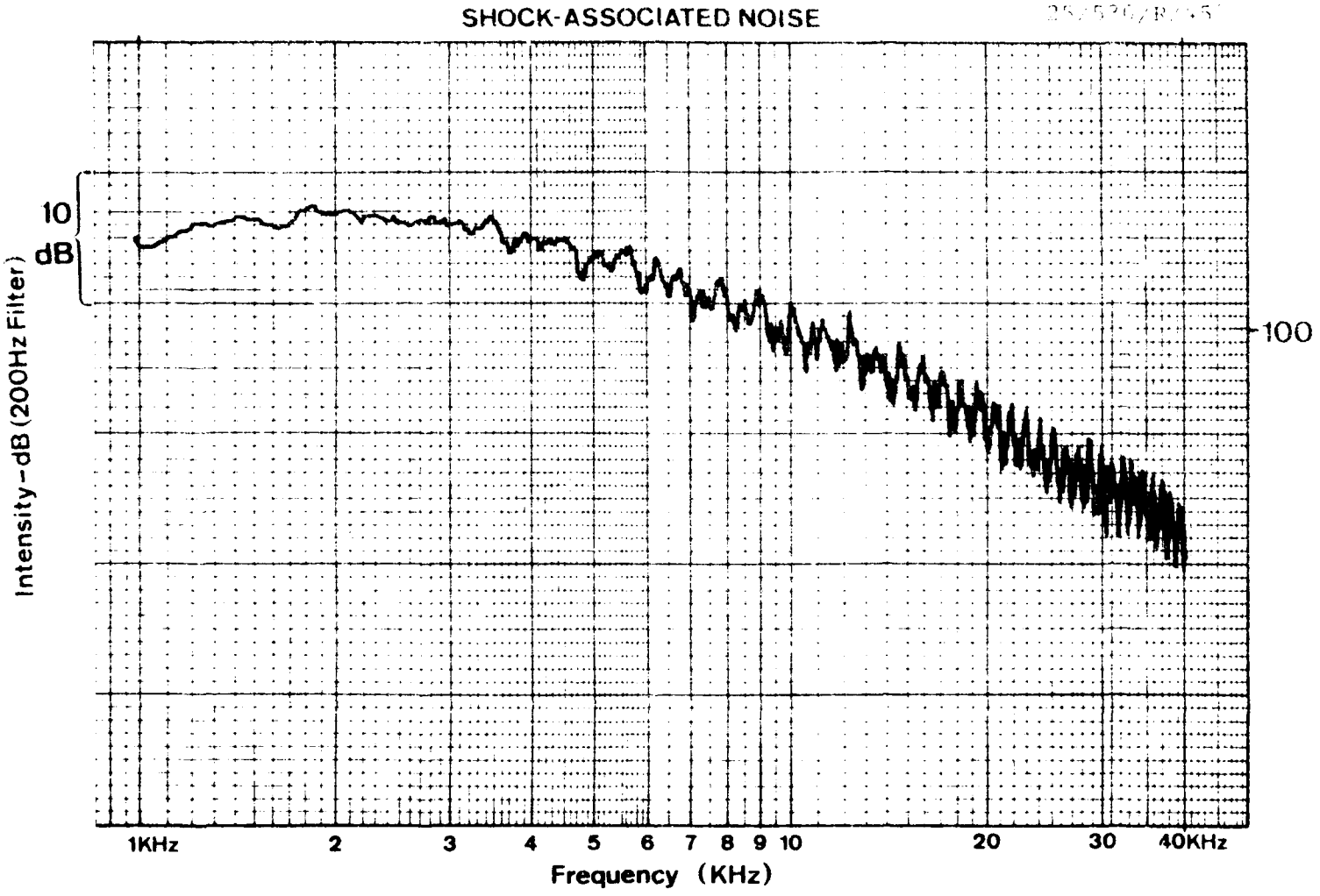

SHOCK-ASSOCIATED NOISE
10
dB
Intensity - dB (200Hz Filter)
1KHz
2
3
4
5
6
7
8
9
10
20
30
40KHz
Frequency (KHz)

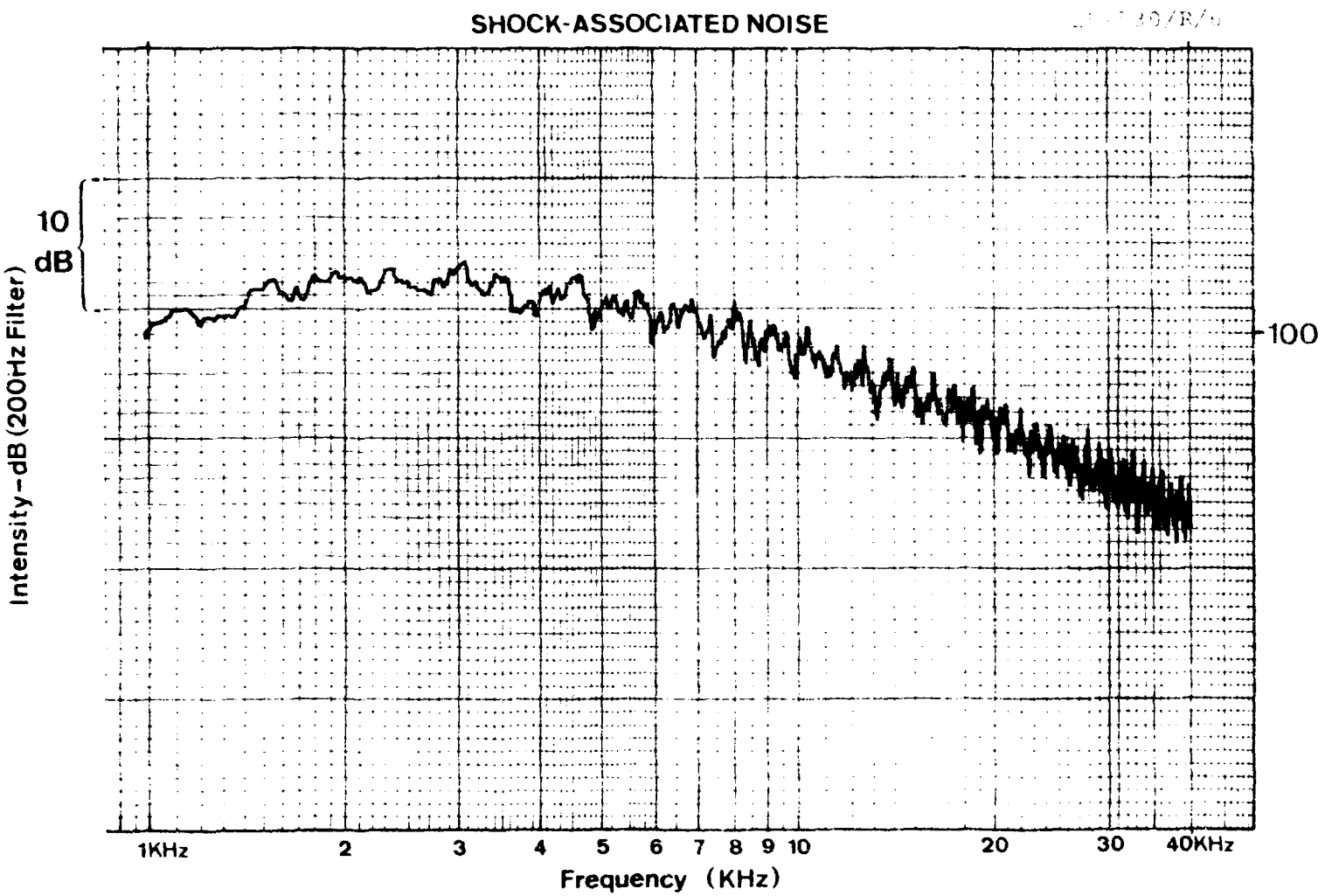

SHOCK-ASSOCIATED NOISE
10
dB
100
Intensity - dB (200Hz Filter)
1KHz
2
3
4
5
6
7
8
9
10
20
30
40KHz
Frequency (KHz)

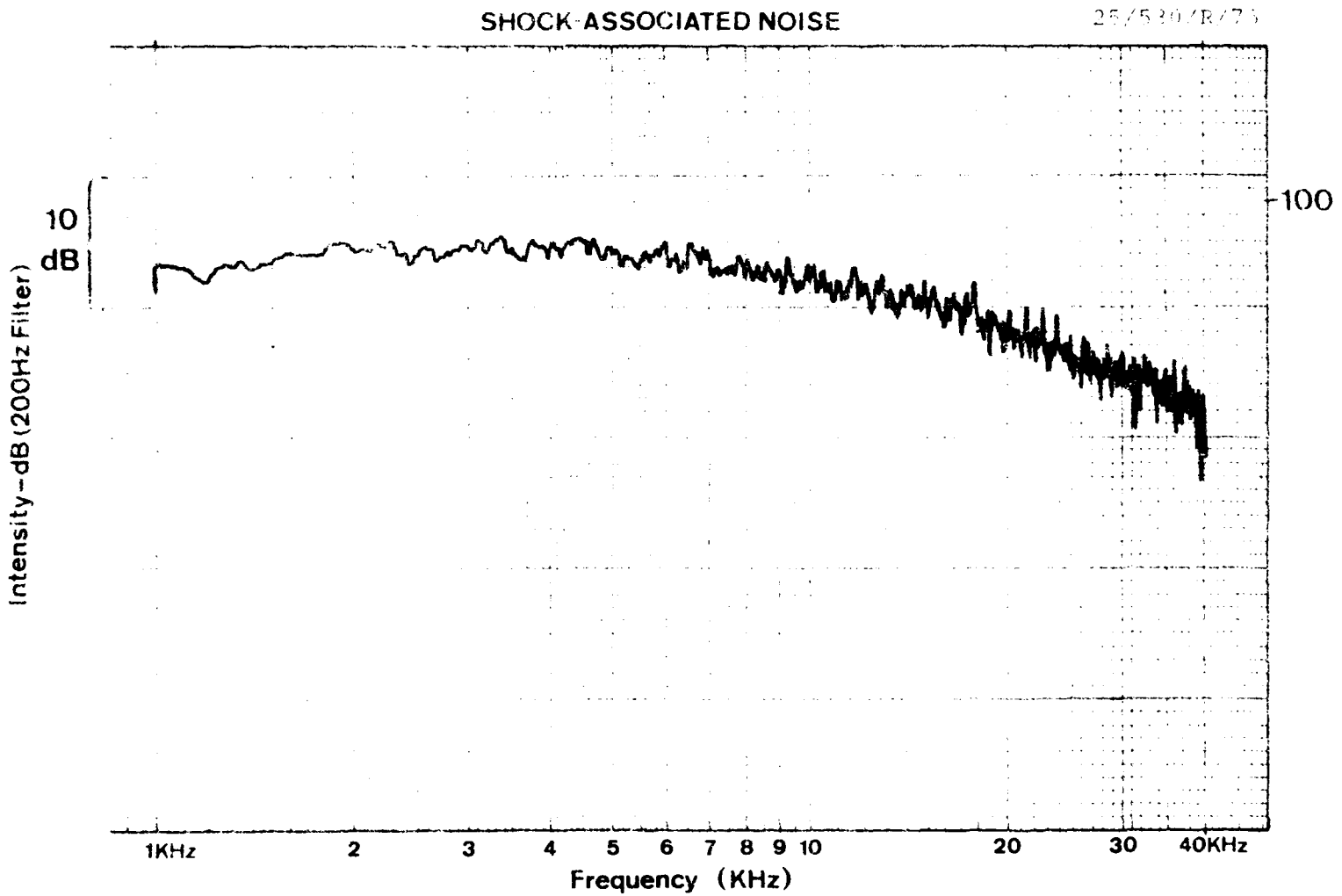

SHOCK-ASSOCIATED NOISE
2J/568/F/135
10
dB
100
Intensity - dB (200Hz Filter)
1KHz
2
3
4
5
6
7
8
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
24/566/E 150
10
dB
100
Intensity-dB (200Hz Filter)
1KHz
2
3
4
5
6
7
8
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
25/530/R/30
10
dB
Intensity-dB (200Hz Filter)
100
1KHz
2
3
4
5
6
7
8
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
10
dB
Intensity – dB (200Hz Filter)
100
1KHz
2
3
4
5
6
7
8
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
10
dB
Intensity-dB (200Hz Filter)
100
1KHz
2
3
4
5
6
7
8
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
25/530/R/75
10
dB
100
Intensity-dB (200Hz Filter)
1KHz
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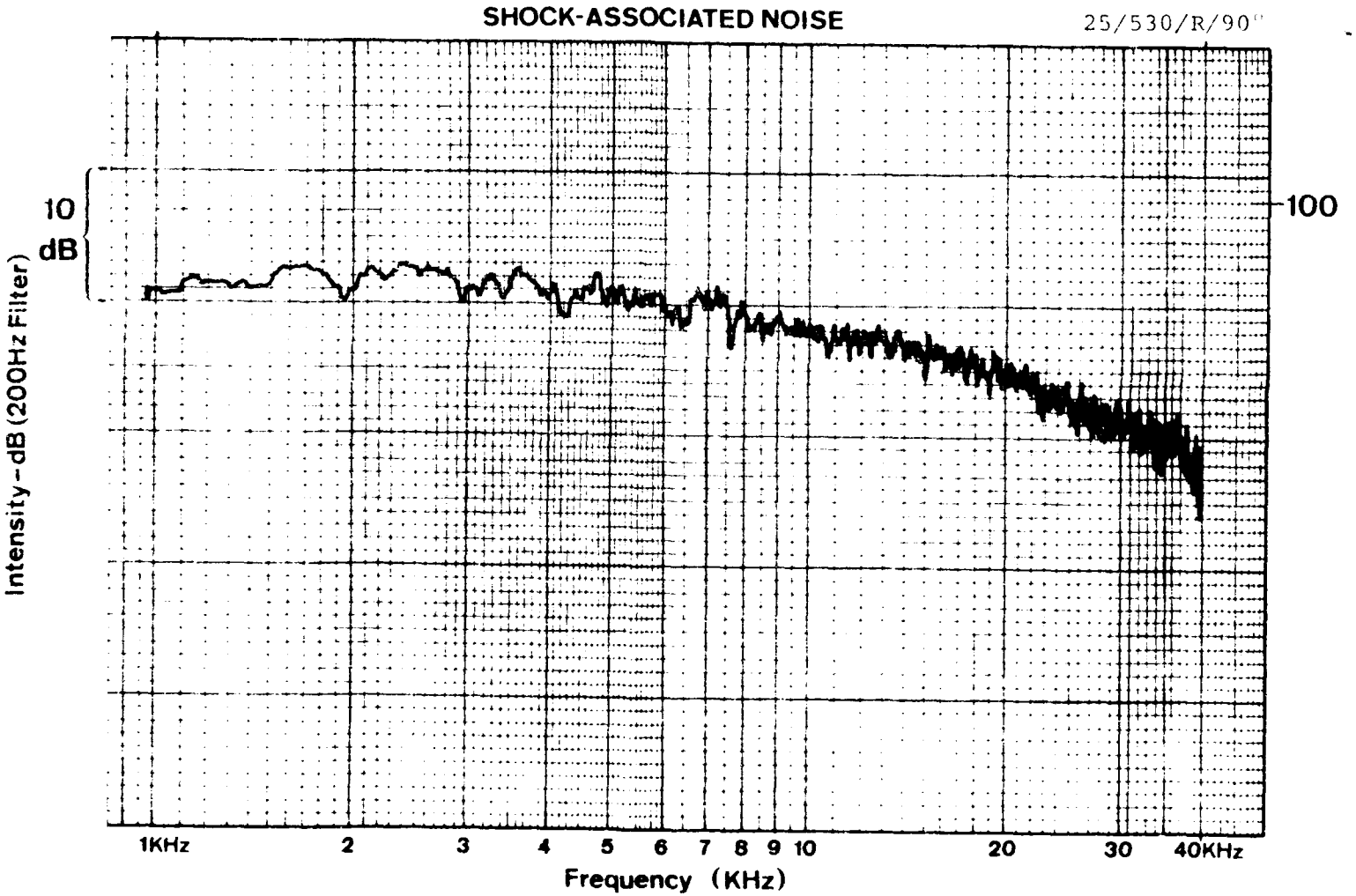
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
25/530/R/90°
10
dB
100
Intensity - dB (200Hz Filter)
1KHz
2
3
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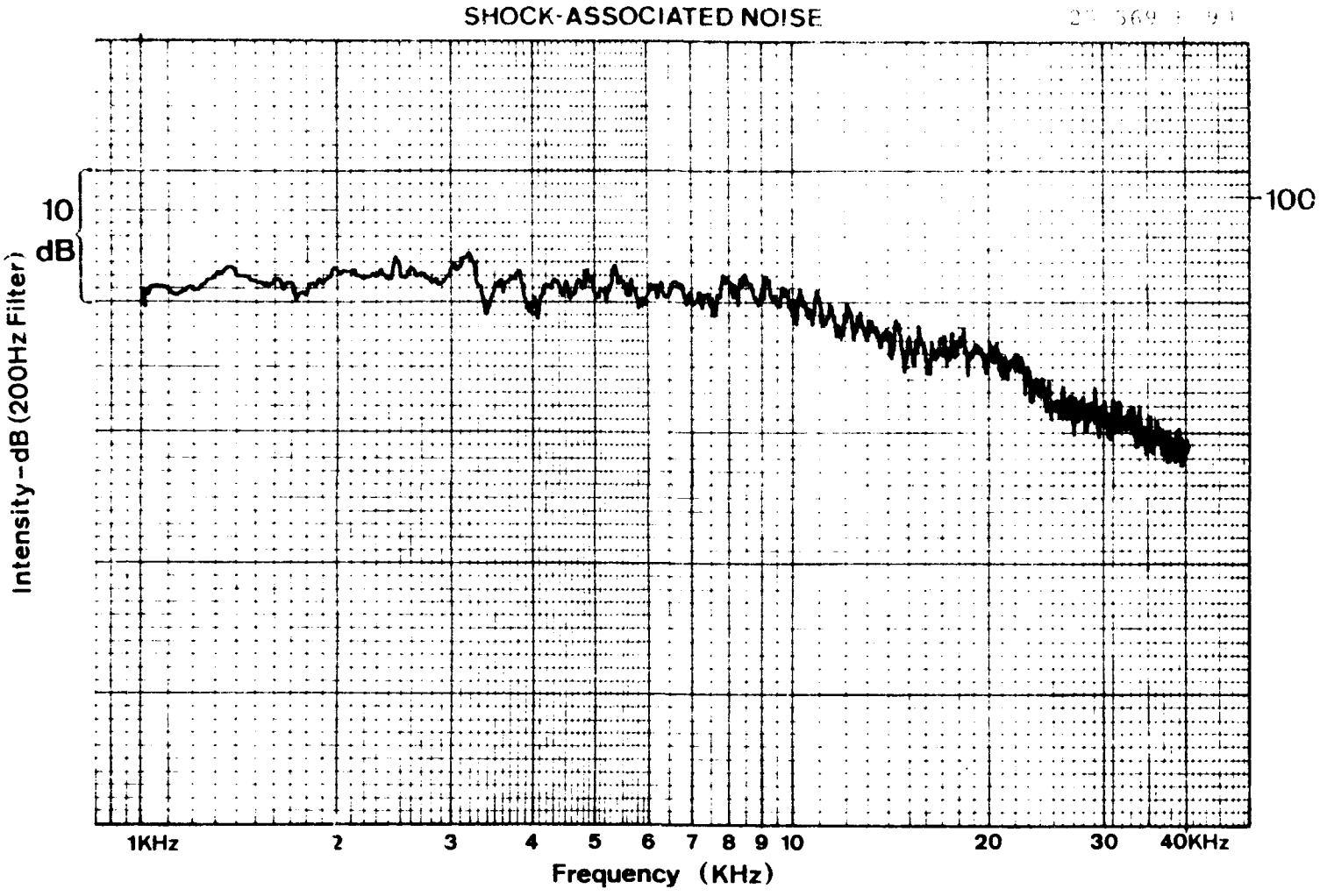
7
8
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
10
dB
100
Intensity-dB (200Hz Filter)
1KHz
2
3
4
5
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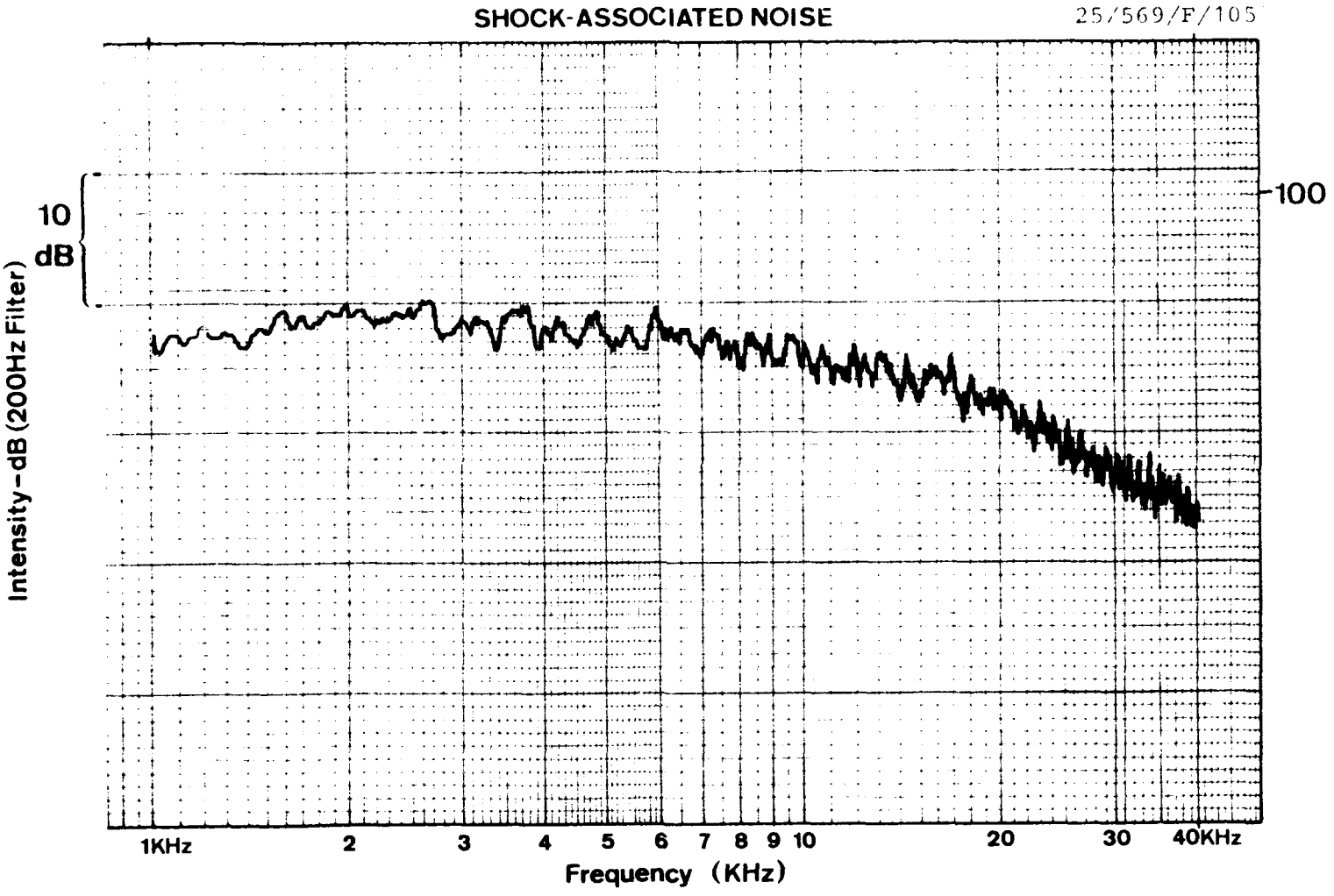
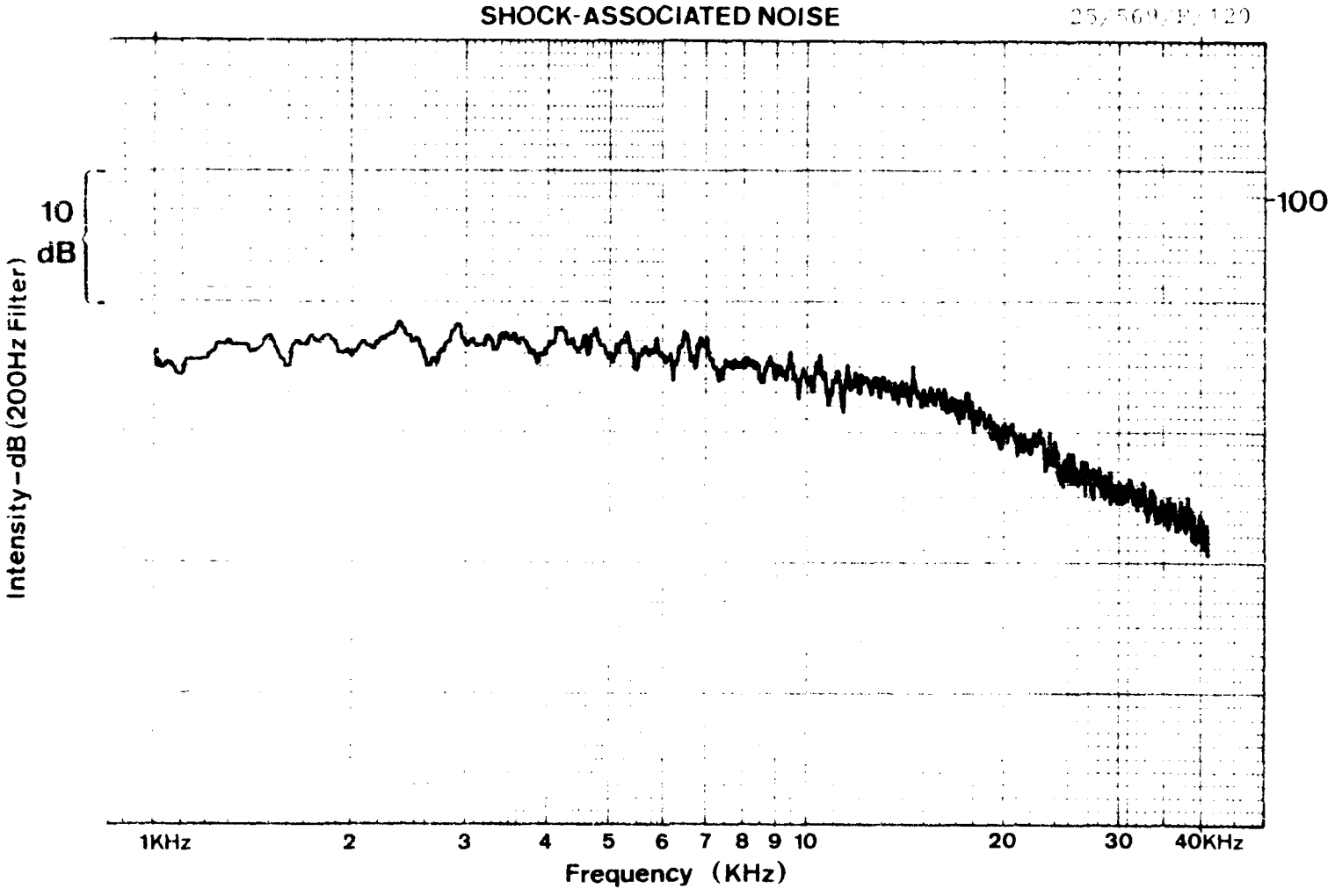
7
8
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
25/569/F/105
10
dB
100
Intensity - dB (200Hz Filter)
1KHz
2
3
4
5
6
7
8
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
25/569/F/120
10
dB
100
Intensity-dB (200Hz Filter)
1KHz
2
3
4
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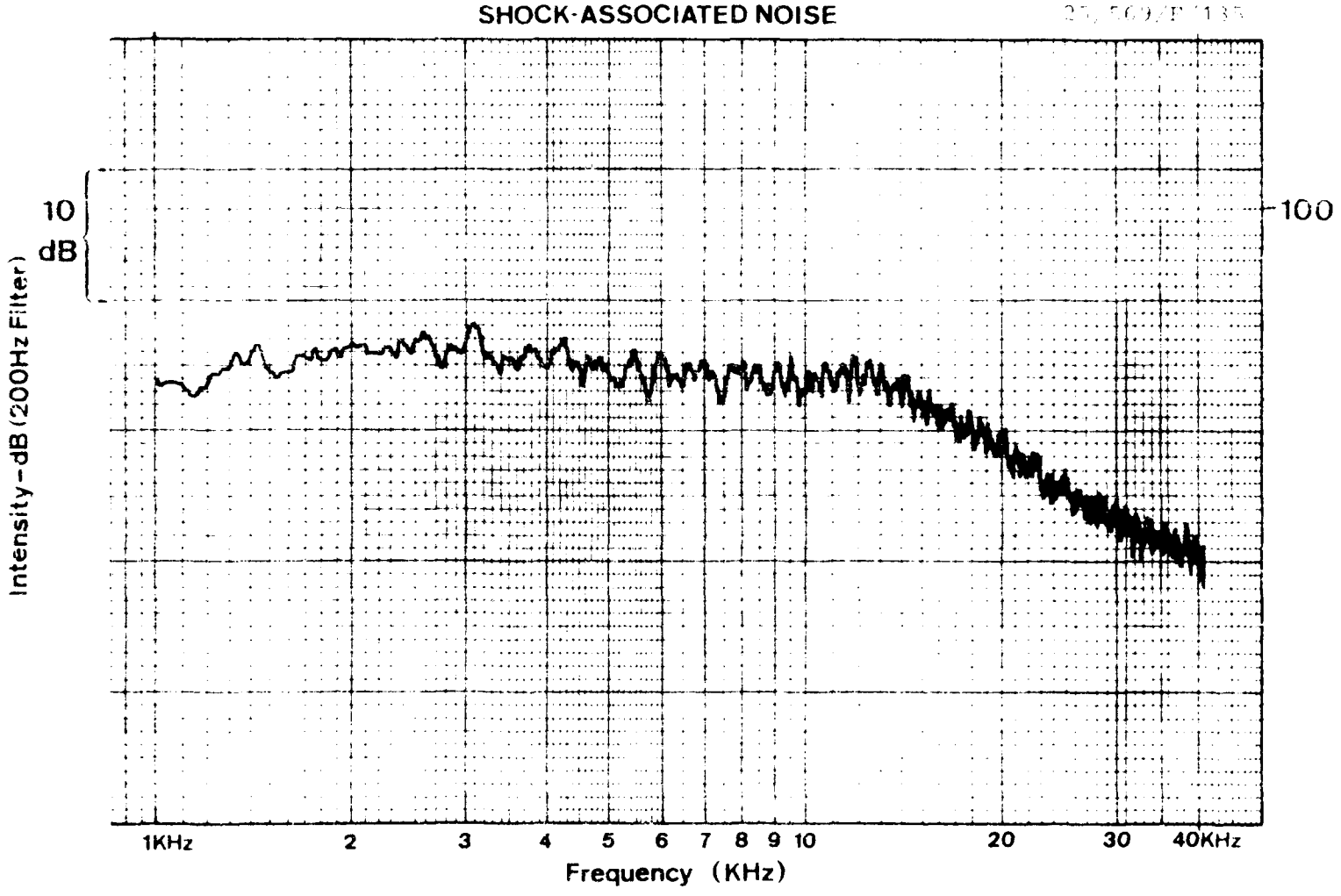
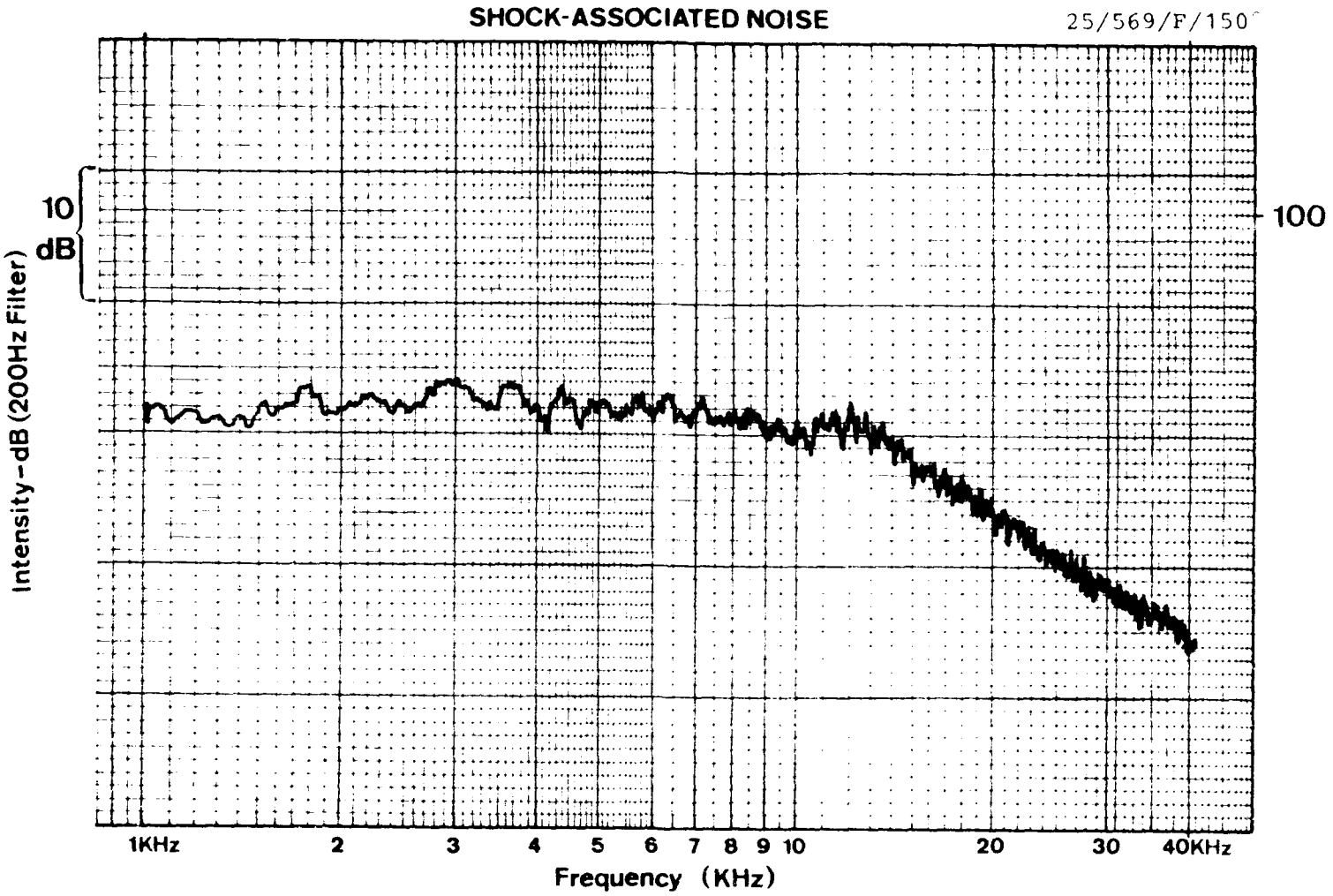
7
8
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
10
dB
100
Intensity-dB (200Hz Filter)
1KHz
2
3
4
5
6
7
8
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
25/569/F/150
10 dB
100
Intensity-dB (200Hz Filter)
1KHz
2
3
4
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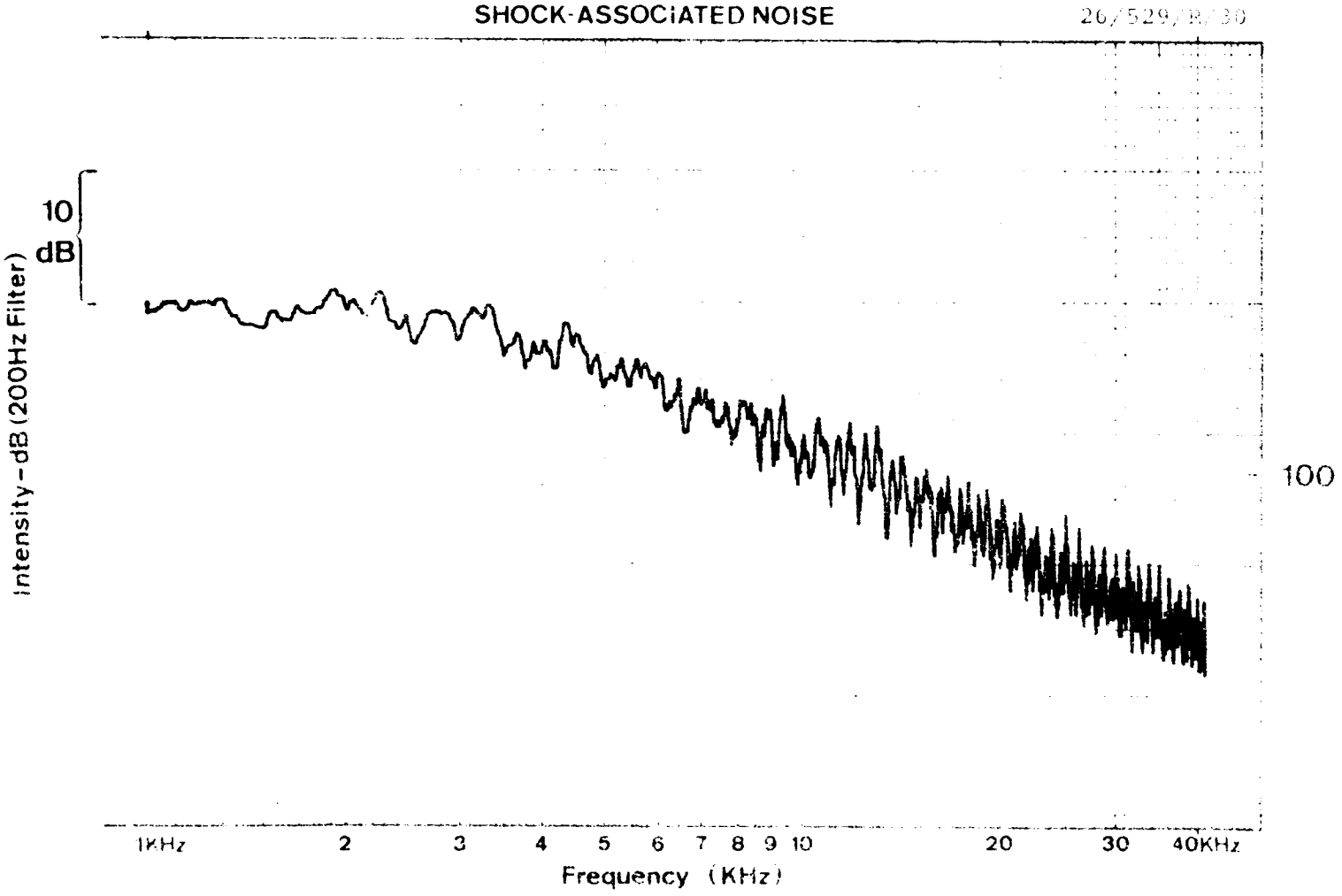
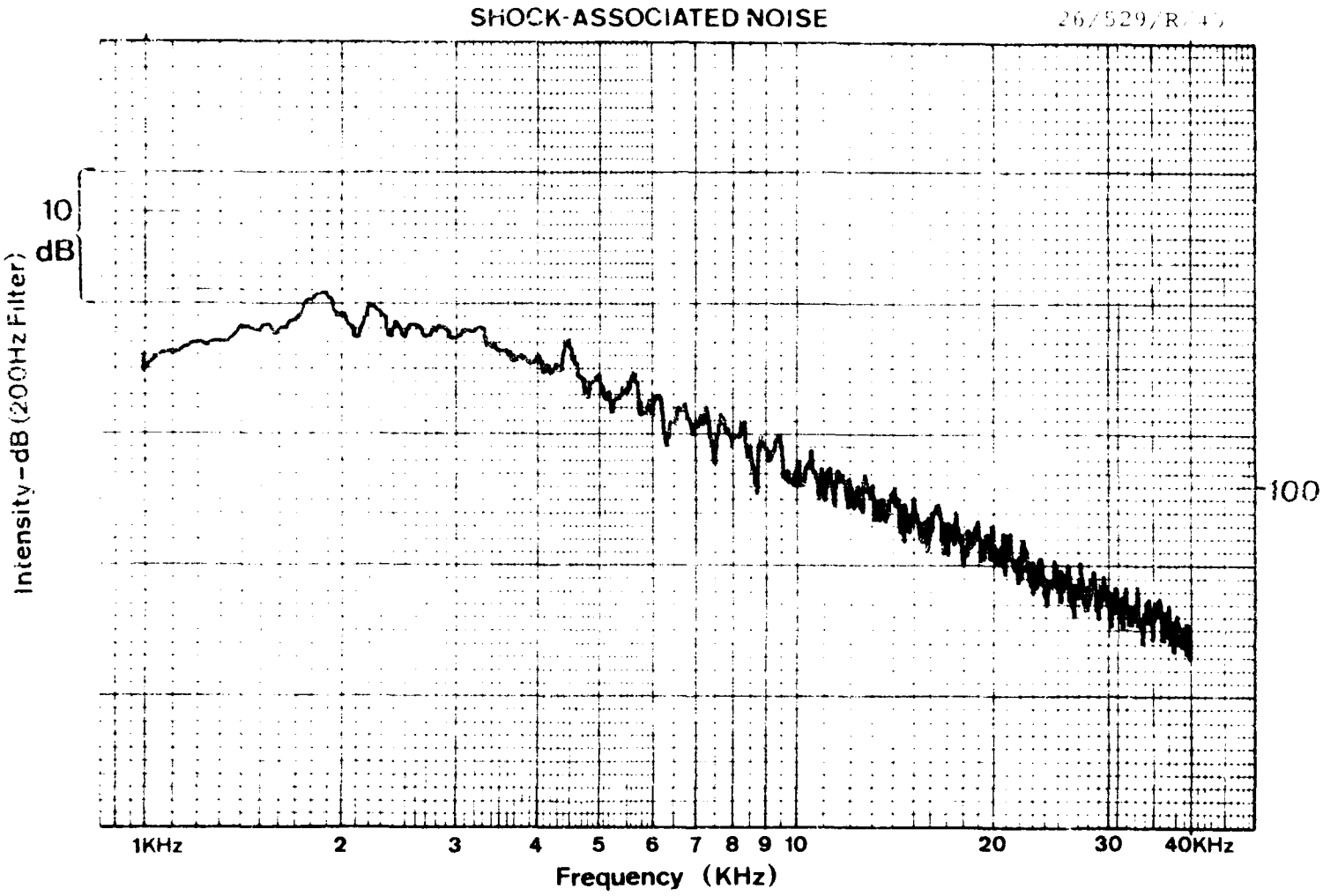
7
8
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
26/529/R/30
10
dB
Intensity - dB (200Hz Filter)
100
1KHz
2
3
4
5
6
7
8
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
26/529/R/45
10
dB
Intensity - dB (200Hz Filter)
100
1KHz
2
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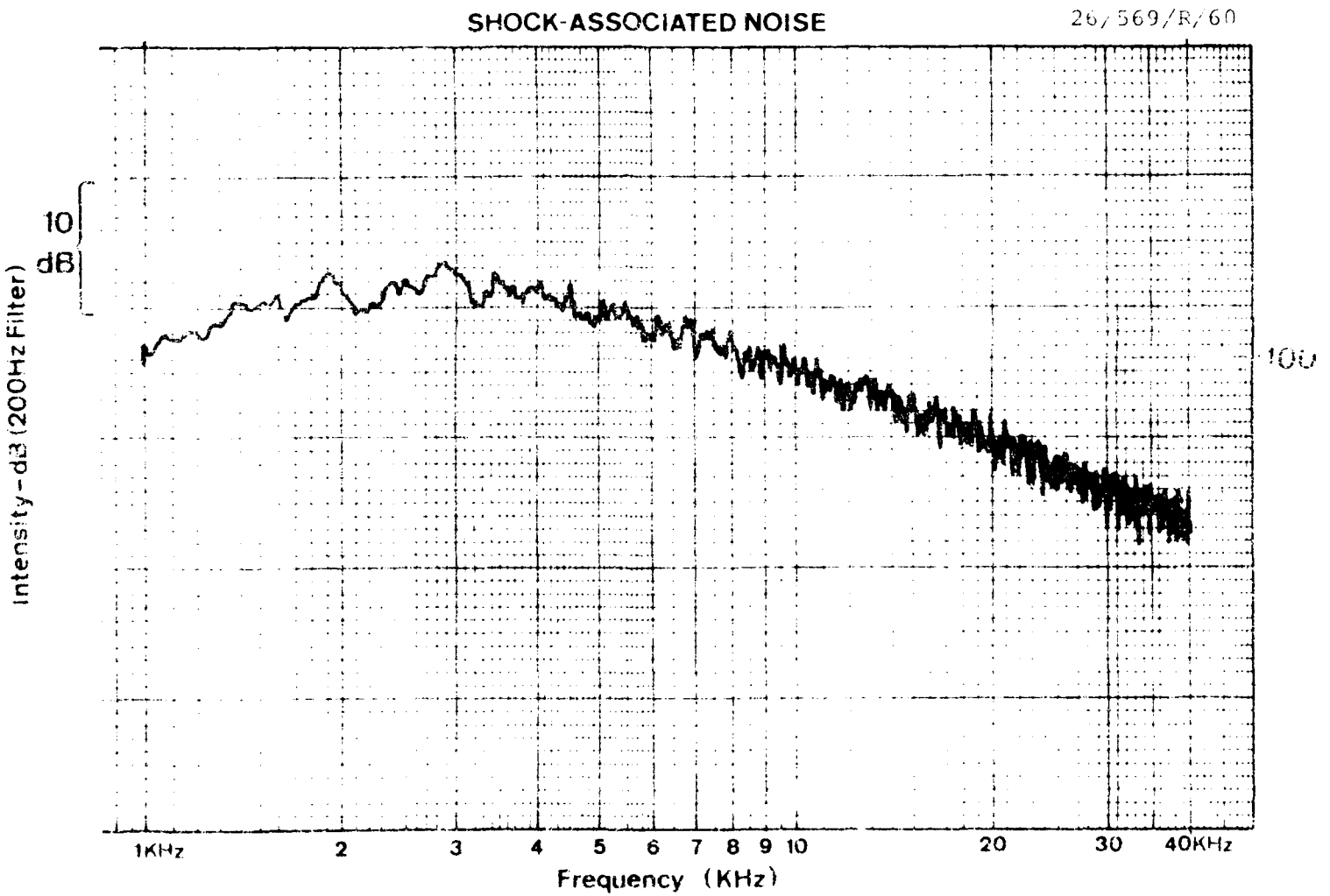
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
26/569/R/60
10
dB
Intensity - dB (200Hz Filter)
100
1KHz
2
3
4
5
6
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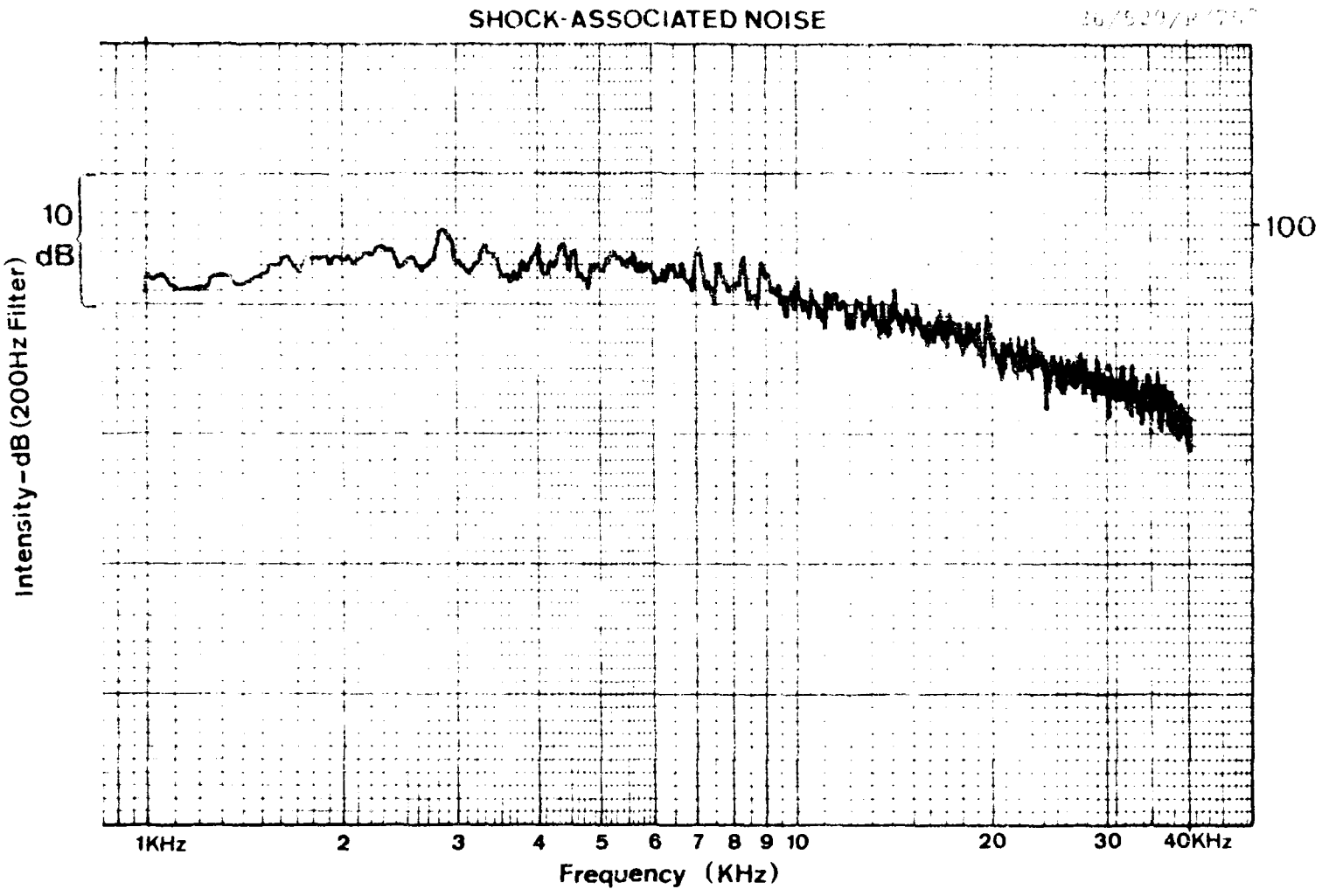
8
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
10
dB
100
Intensity-dB (200Hz Filter)
1KHz
2
3
4
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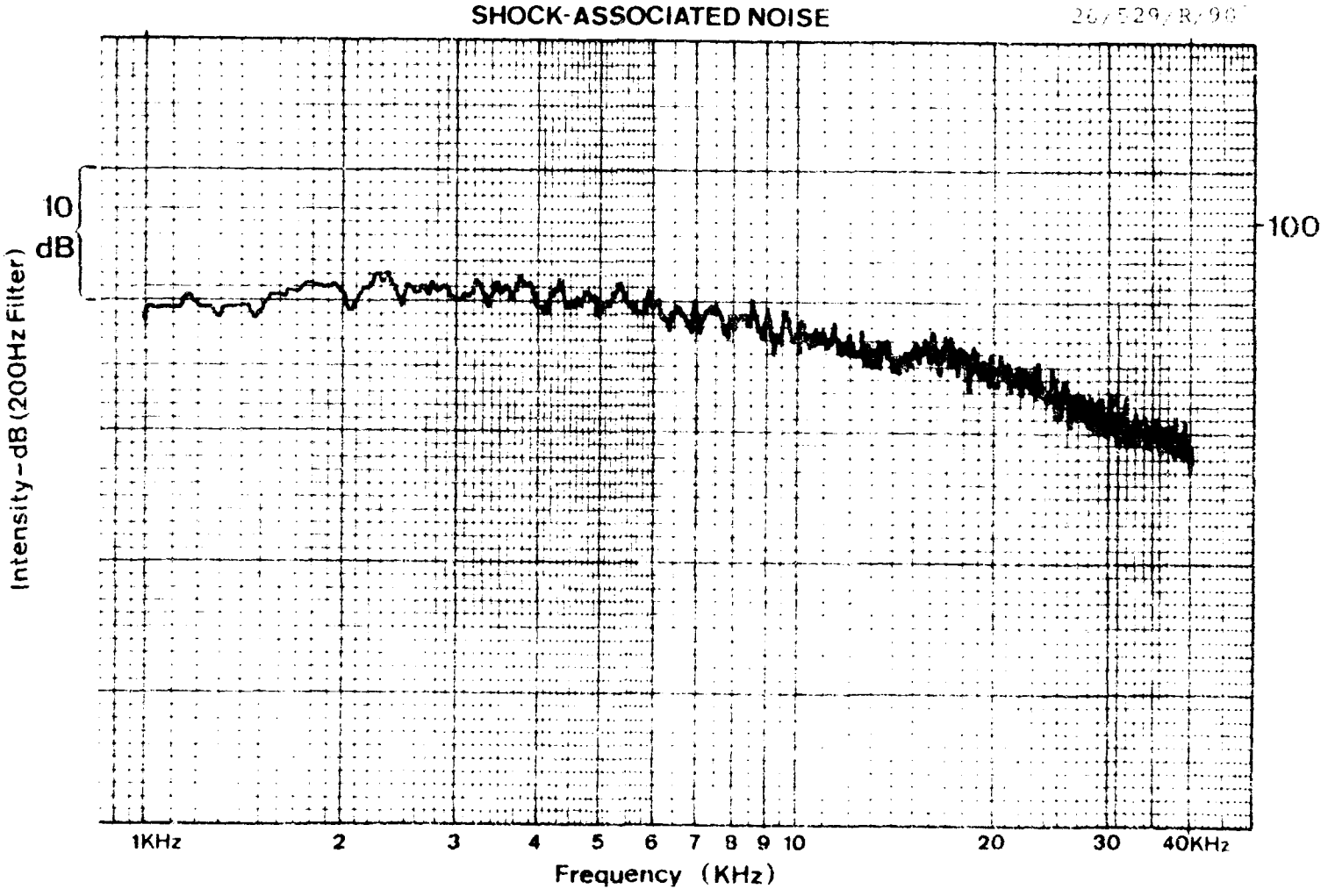
8
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
10
dB
100
Intensity - dB (200Hz Filter)
1KHz
2
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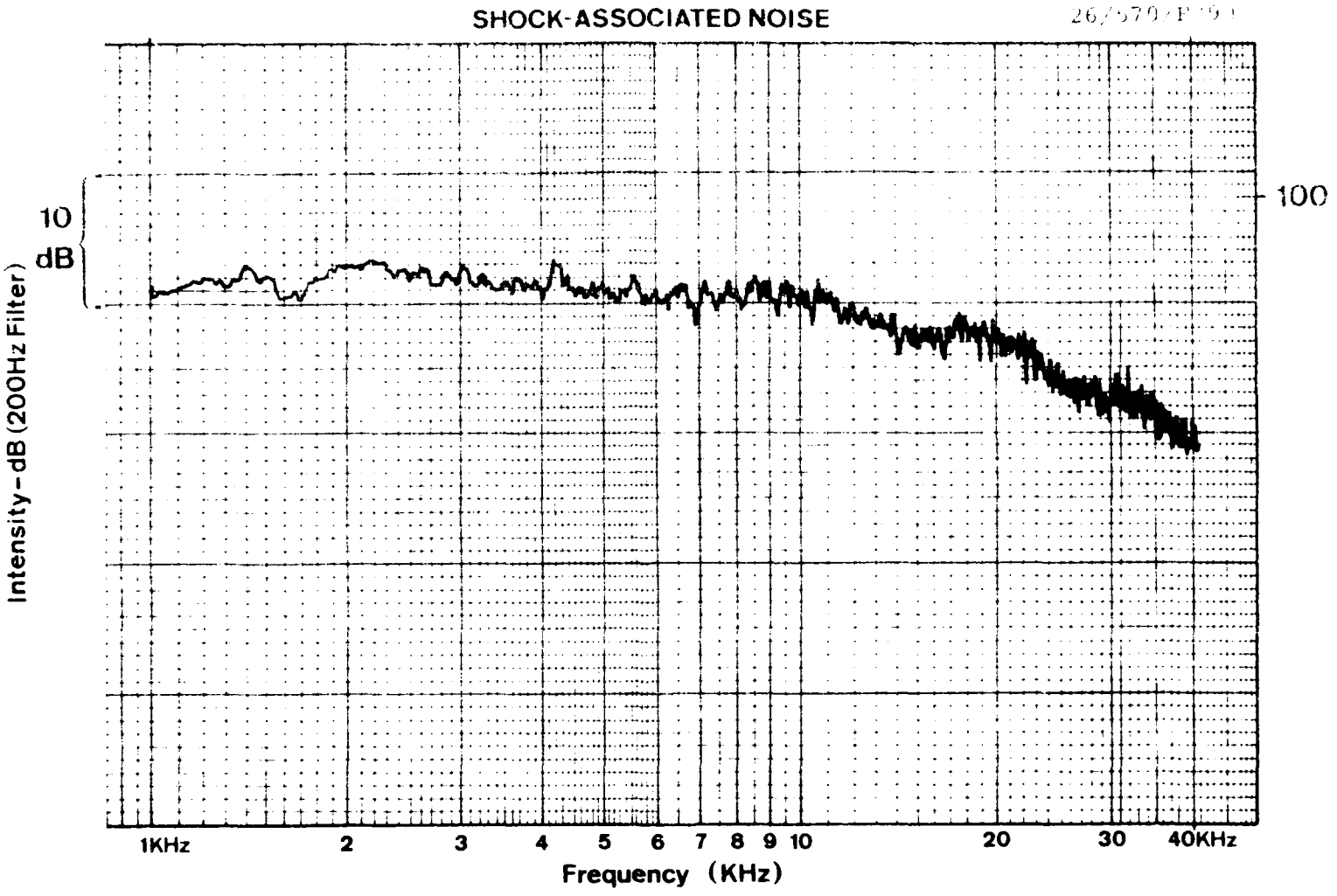
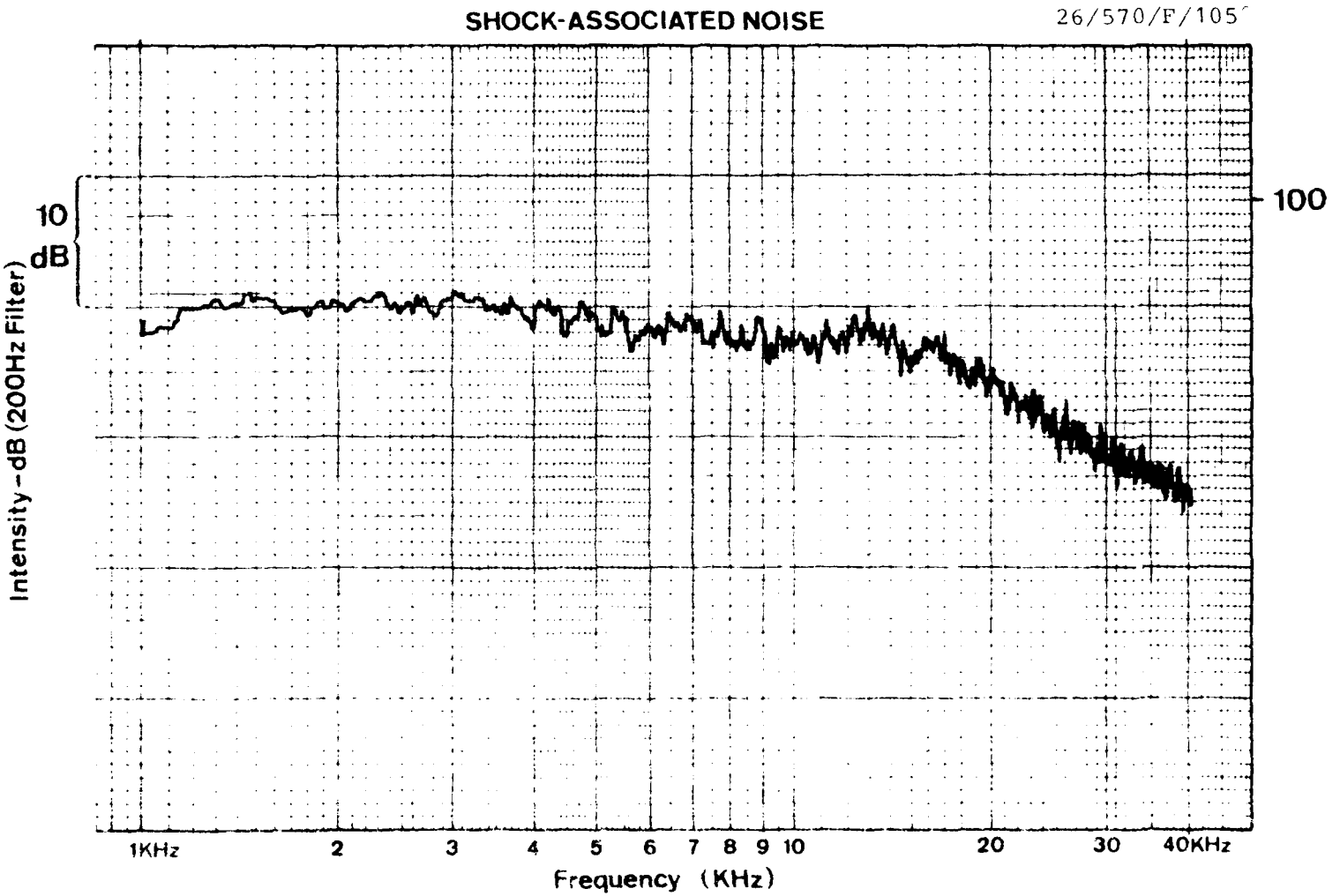
6
7
8
9
10
20
30
40KHz
Frequency (KHz)

SHOCK-ASSOCIATED NOISE




SHOCK-ASSOCIATED NOISE
26/570/F/105
10
dB
100
Intensity - dB (200Hz Filter)
1KHz
2
3
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7
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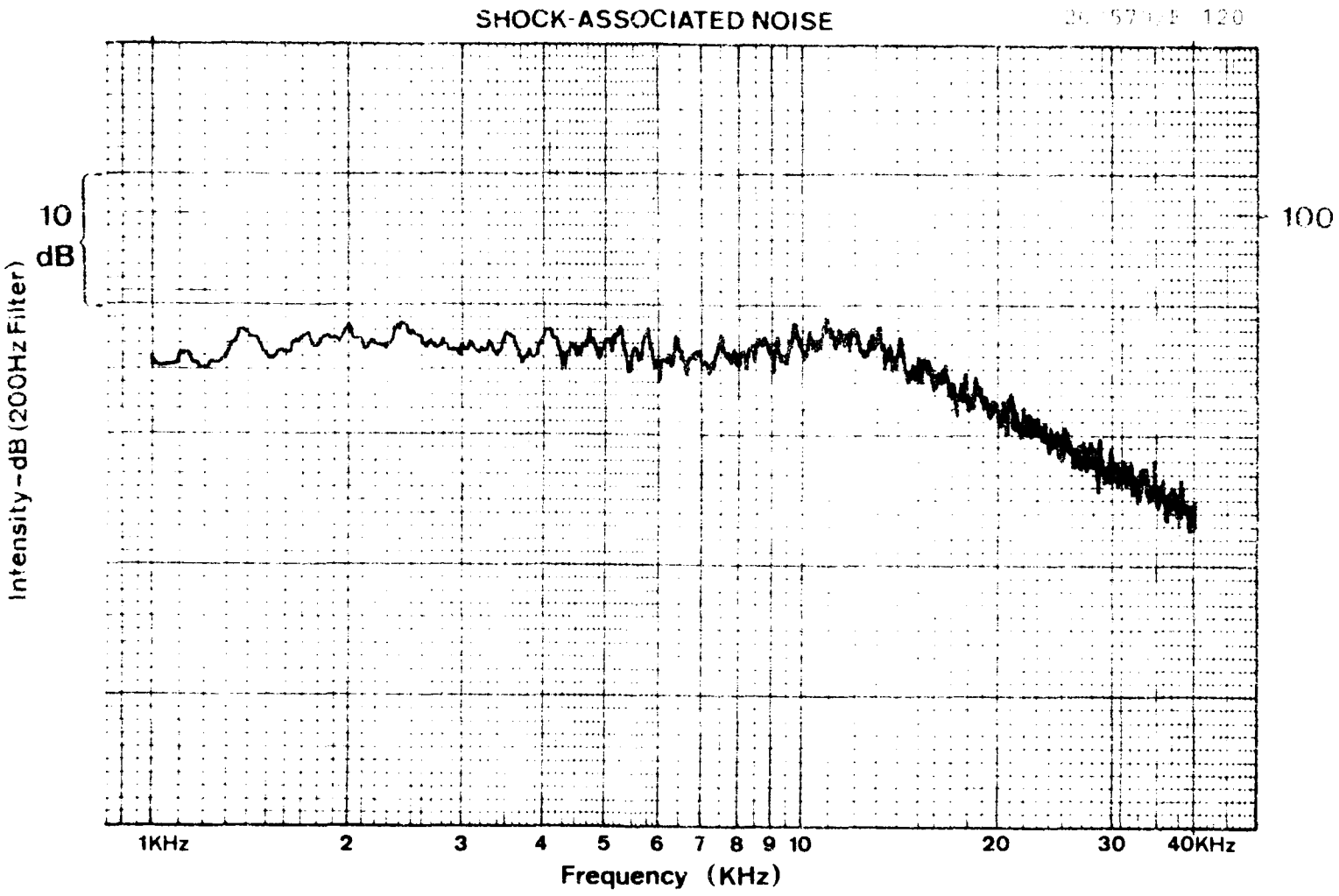
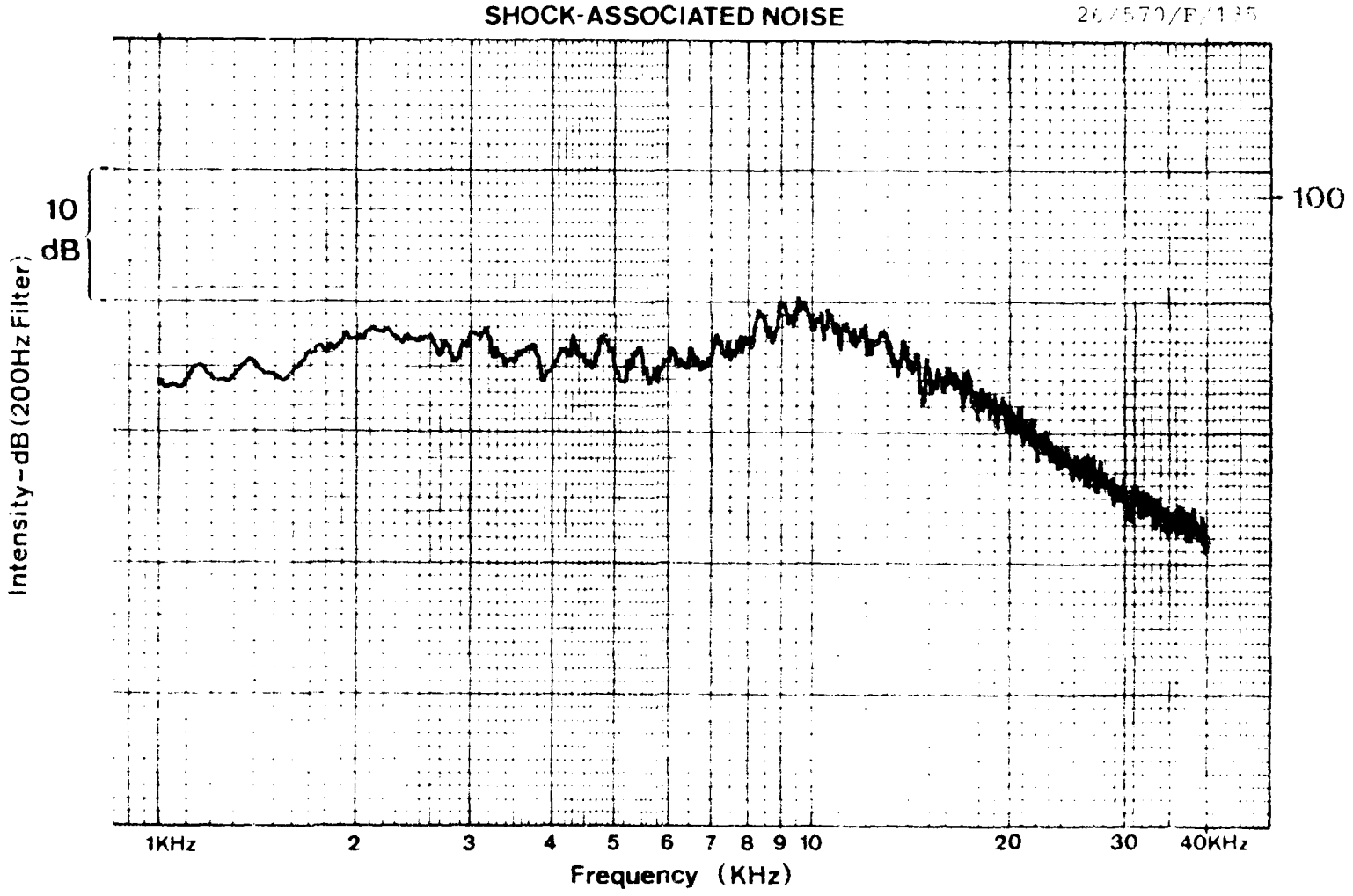
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
10
dB
100
Intensity - dB (200Hz Filter)
1KHz
2
3
4
5
6
7
8
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
26/570/F/135
10
dB
100
Intensity - dB (200Hz Filter)
1KHz
2
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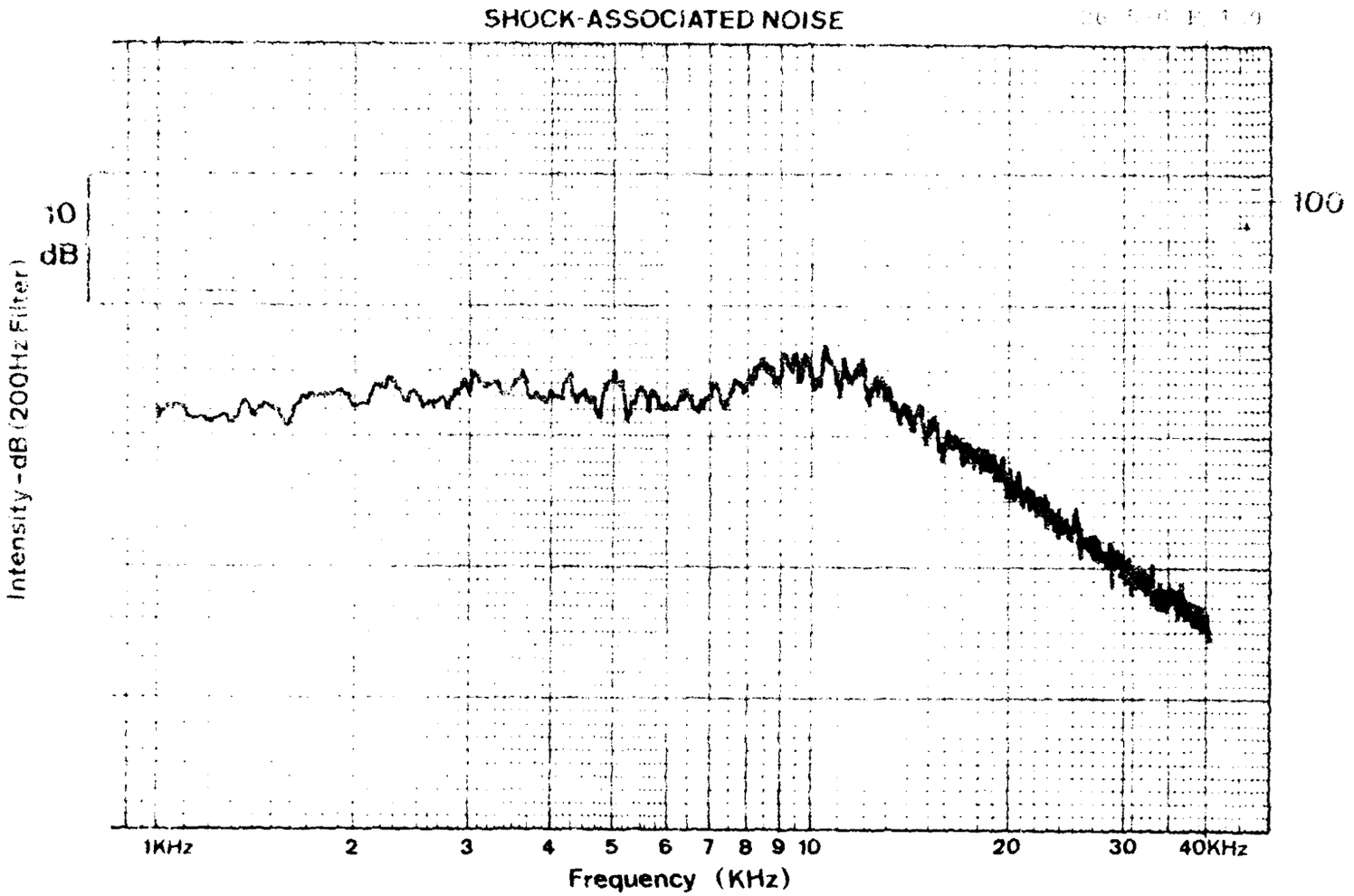
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
10
dB
100
Intensity - dB (200Hz Filter)
1KHz
2
3
4
5
6
7
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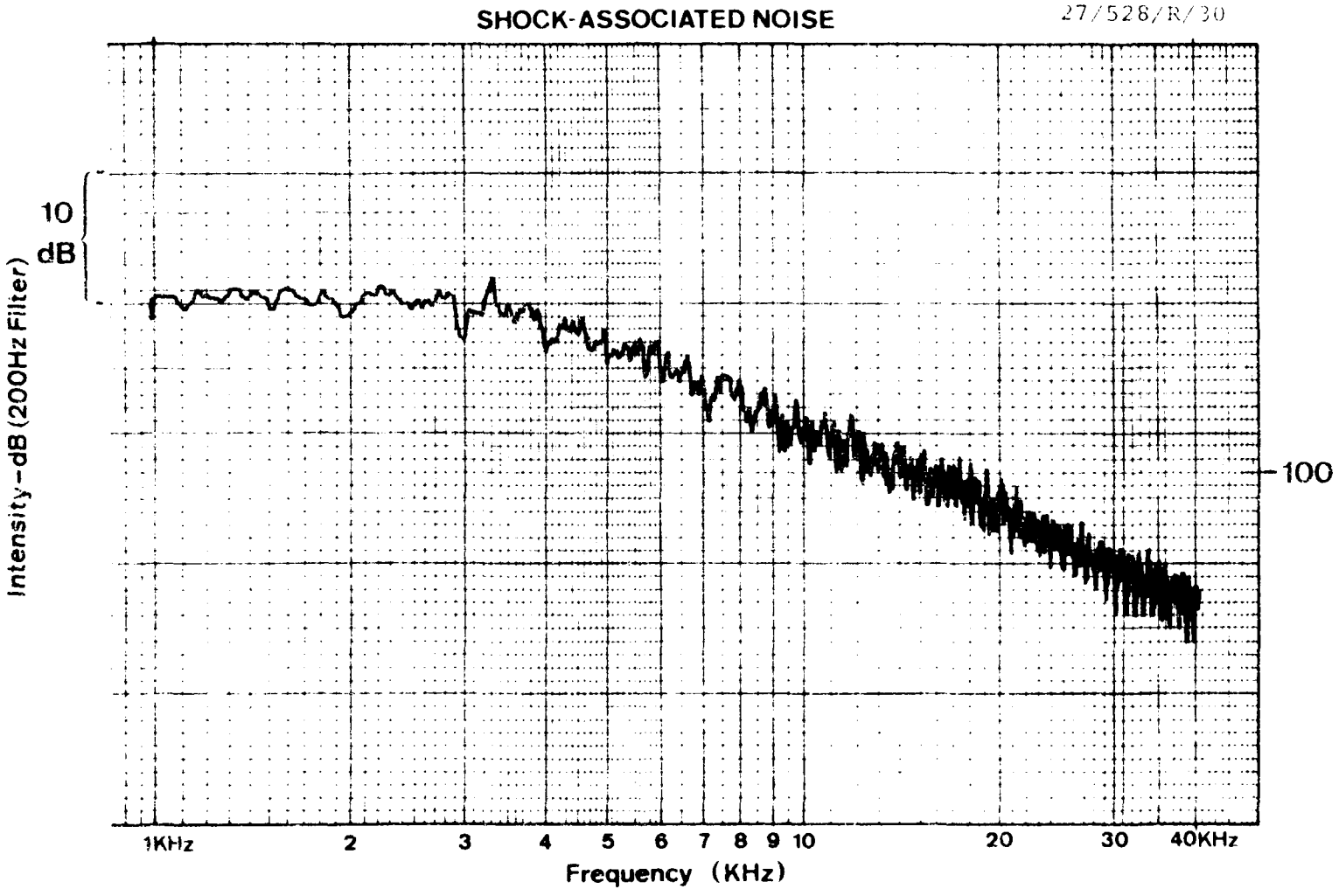
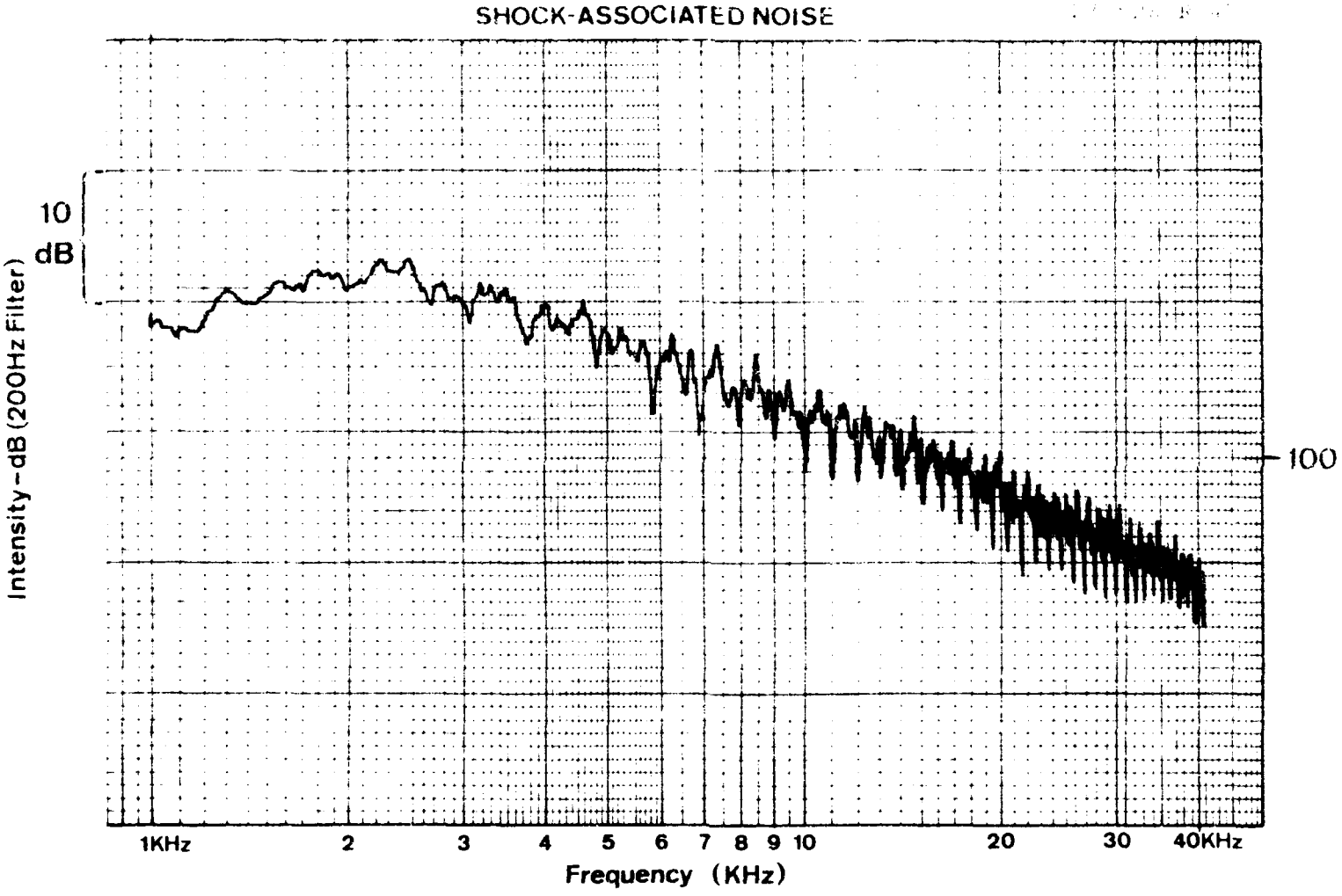
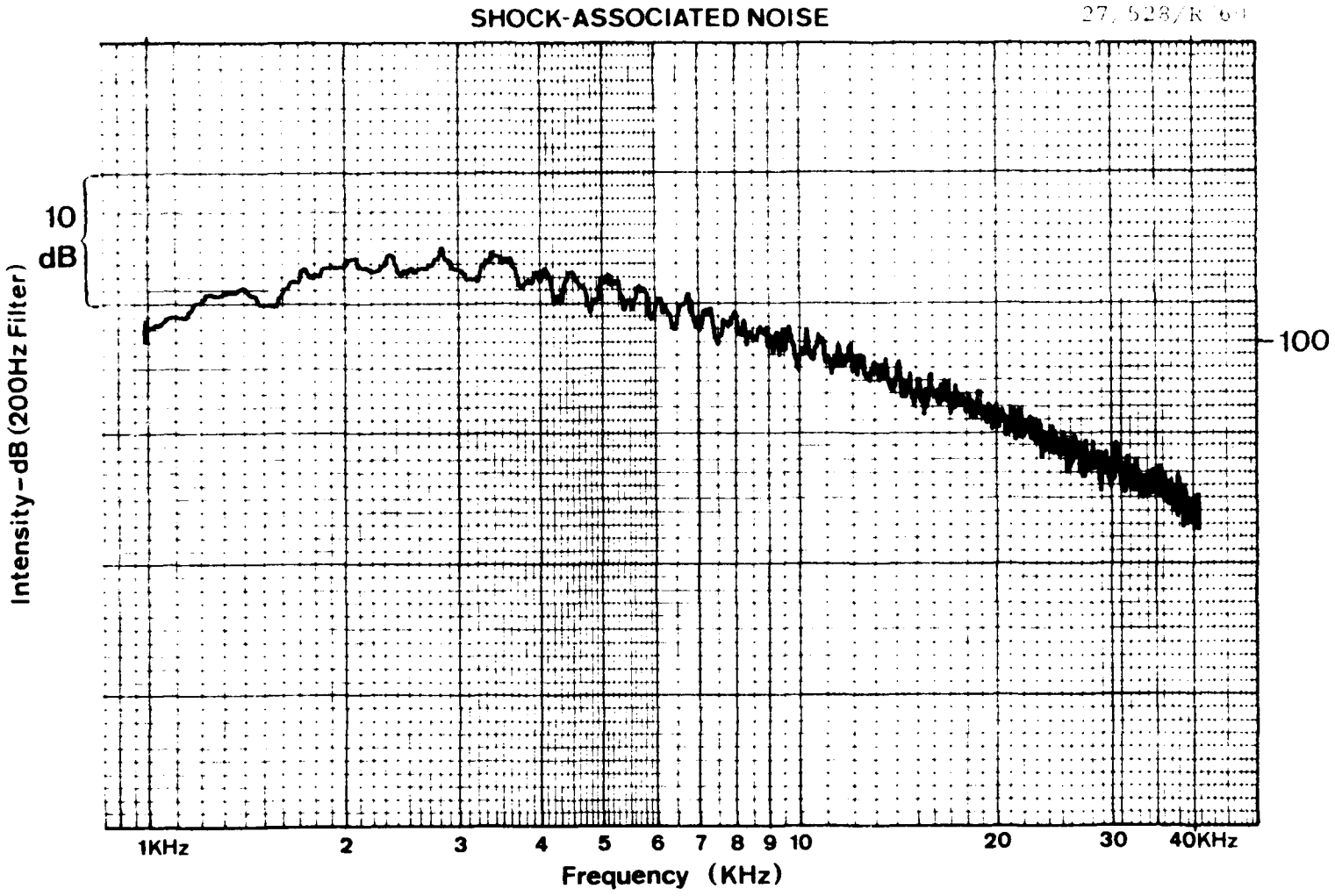
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
27/528/R/30
10
dB
Intensity-dB (200Hz Filter)
100
1KHz
2
3
4
5
6
7
8
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
10
dB
Intensity - dB (200Hz Filter)
100
1KHz
2
3
4
5
6
7
8
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
27, 528/R 64
10
dB
Intensity-dB (200Hz Filter)
100
1KHz
2
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4
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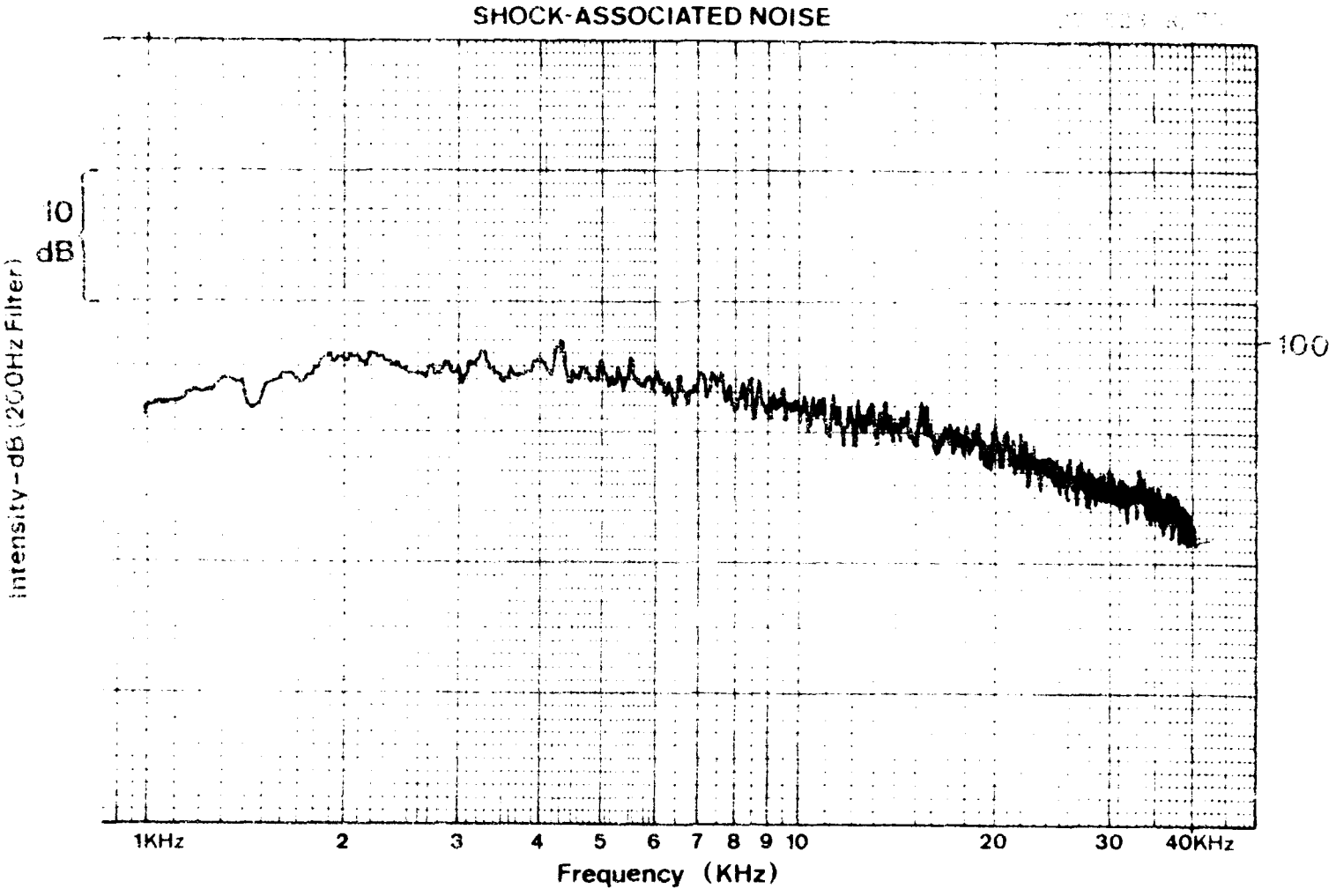
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
10
dB
Intensity - dB (200Hz Filter)
100
1KHz
2
3
4
5
6
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9
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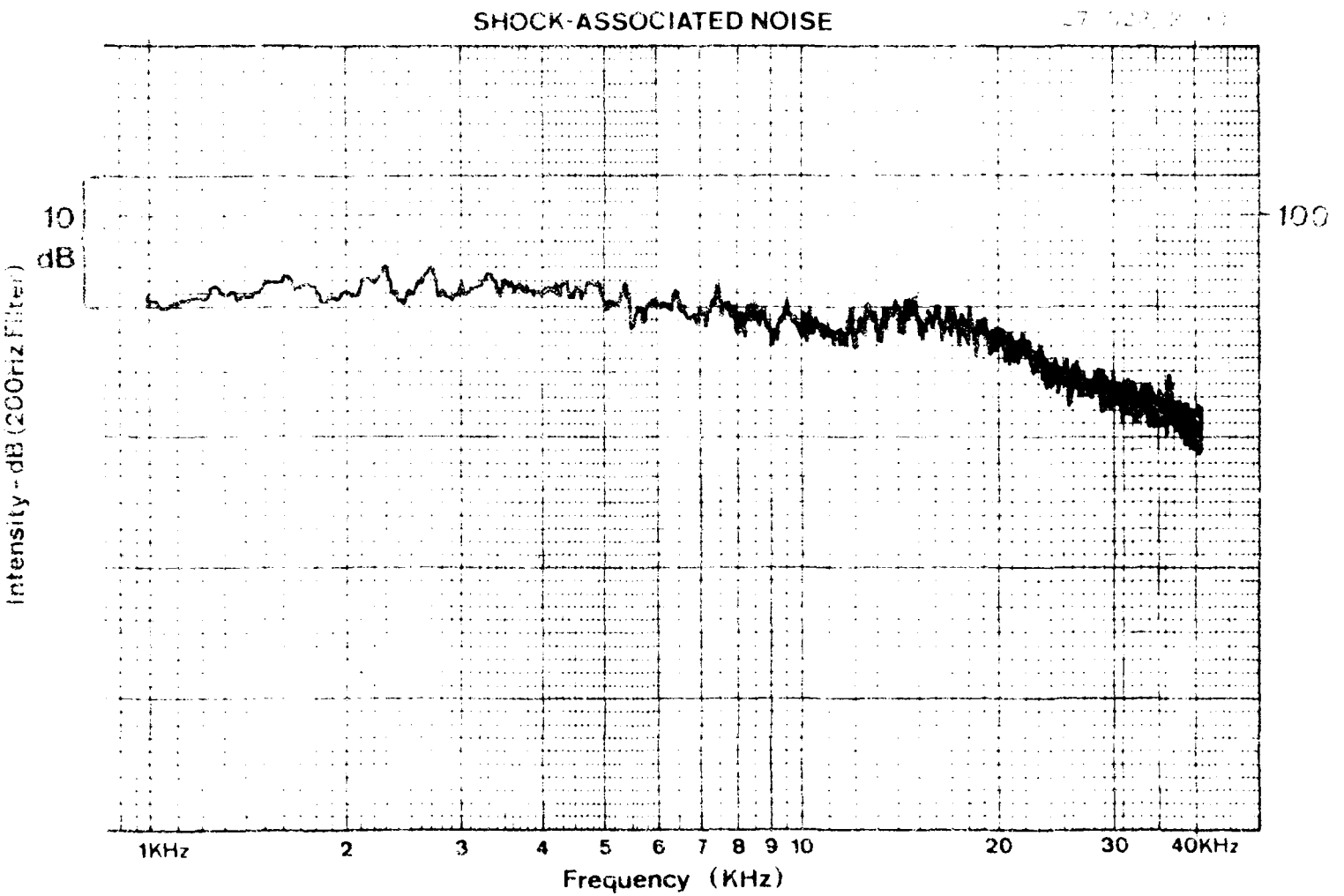
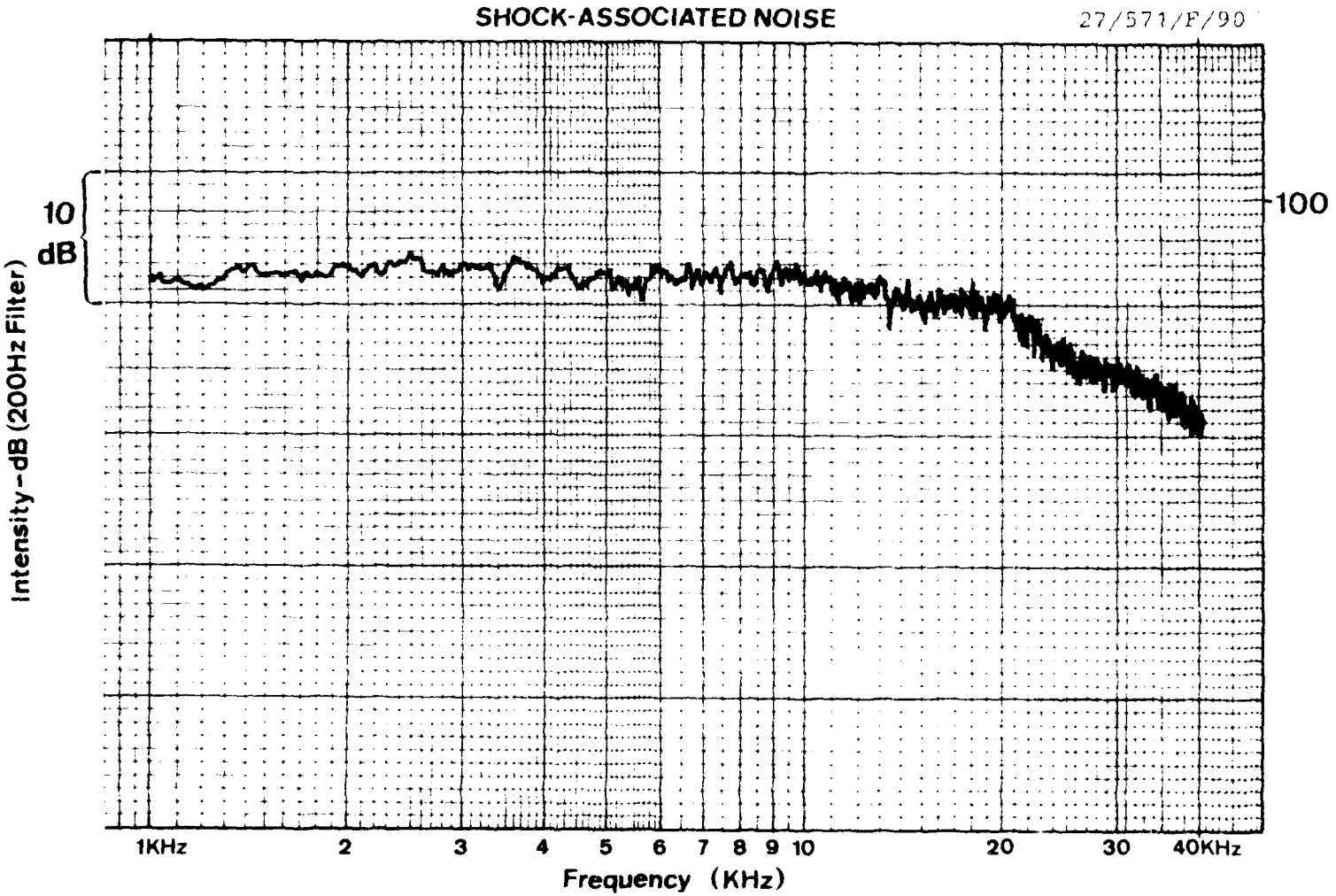
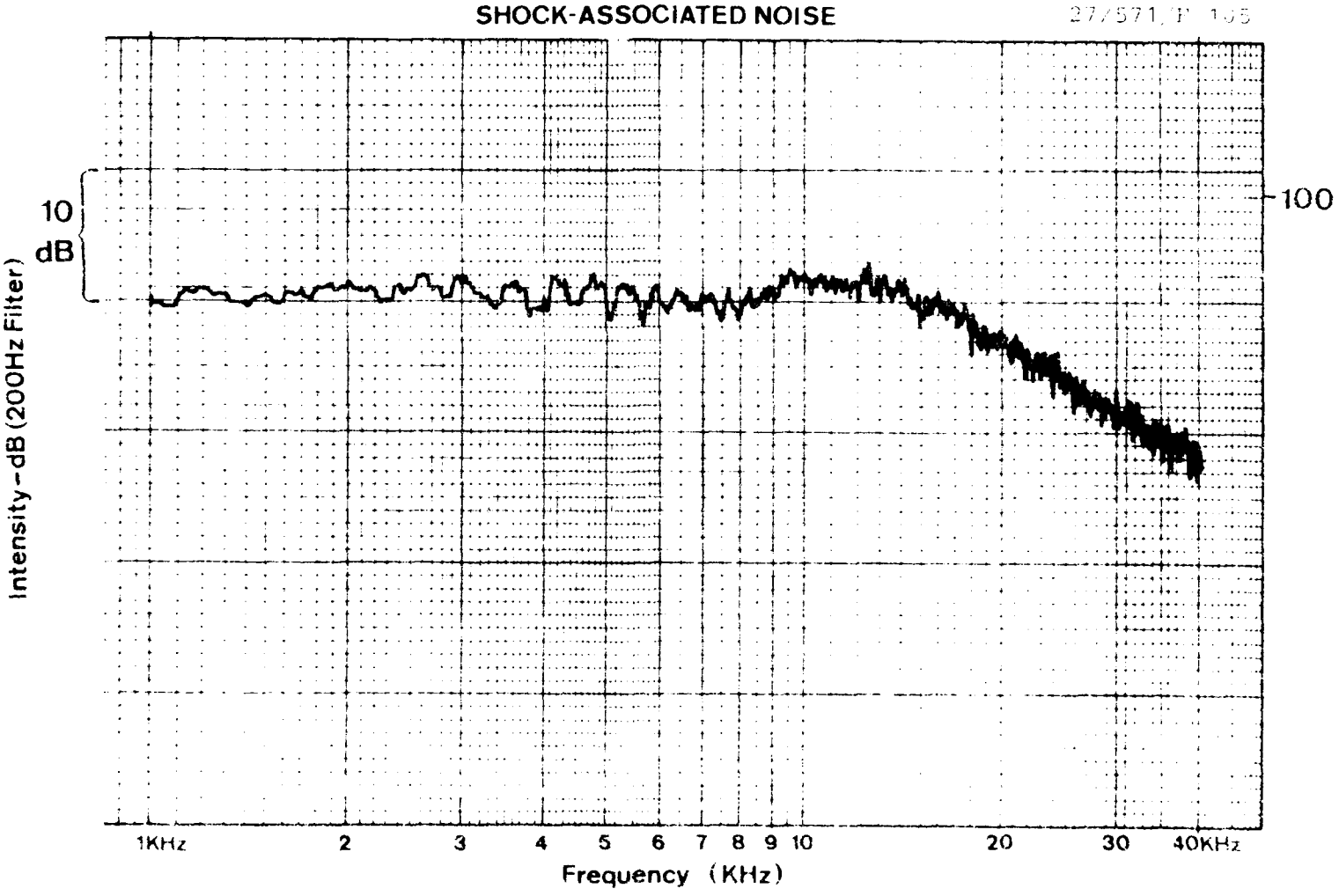
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
10
dB
100
Intensity - dB (200Hz Filter)
1KHz
2
3
4
5
6
7
8
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
27/571/F/90
10
dB
100
Intensity-dB (200Hz Filter)
1KHz
2
3
4
5
6
7
8
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
27/571,P 105
10
dB
100
Intensity-dB (200Hz Filter)
1KHz
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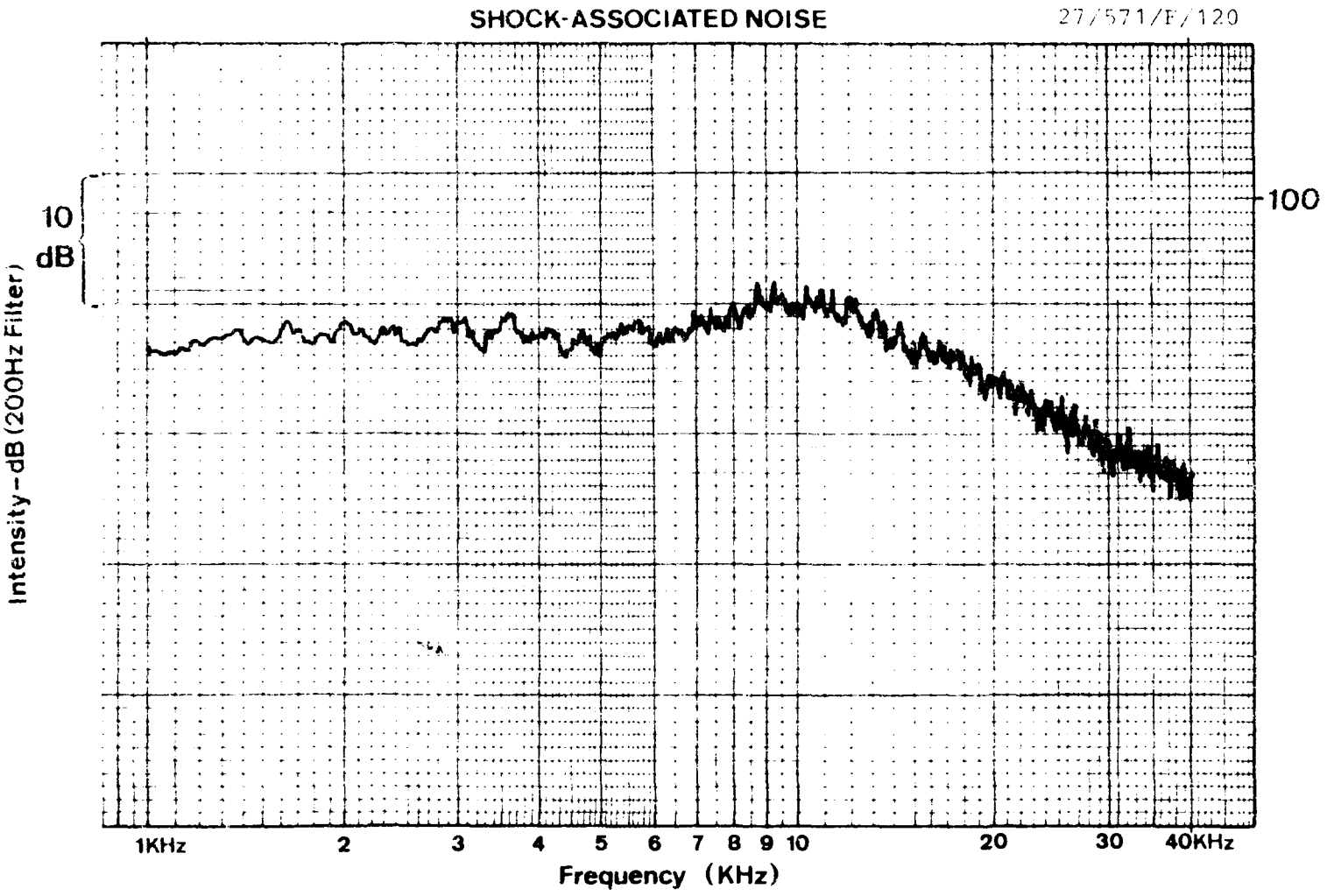
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
27/571/F/120
10
dB
100
Intensity - dB (200Hz Filter)
1KHz
2
3
4
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6
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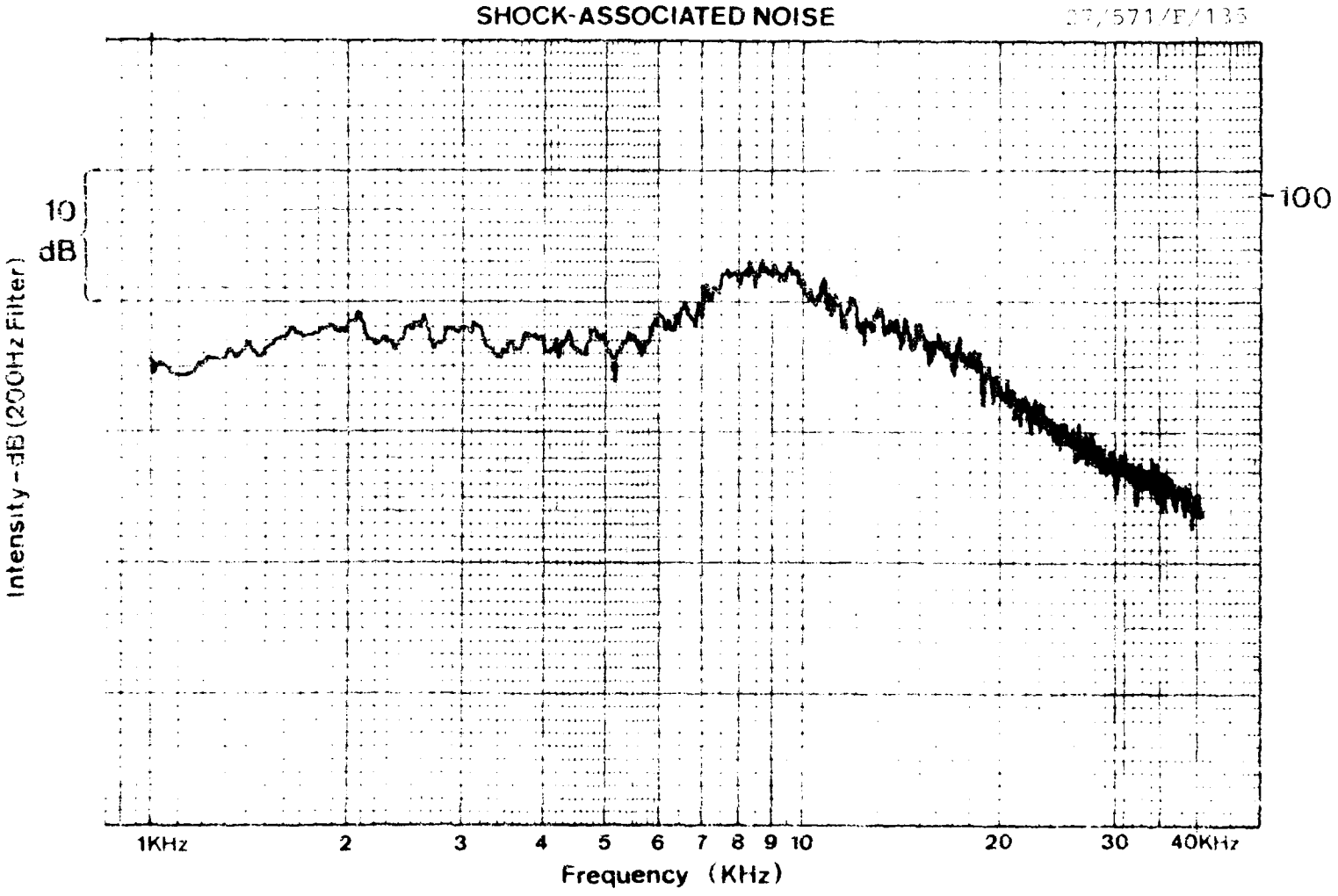
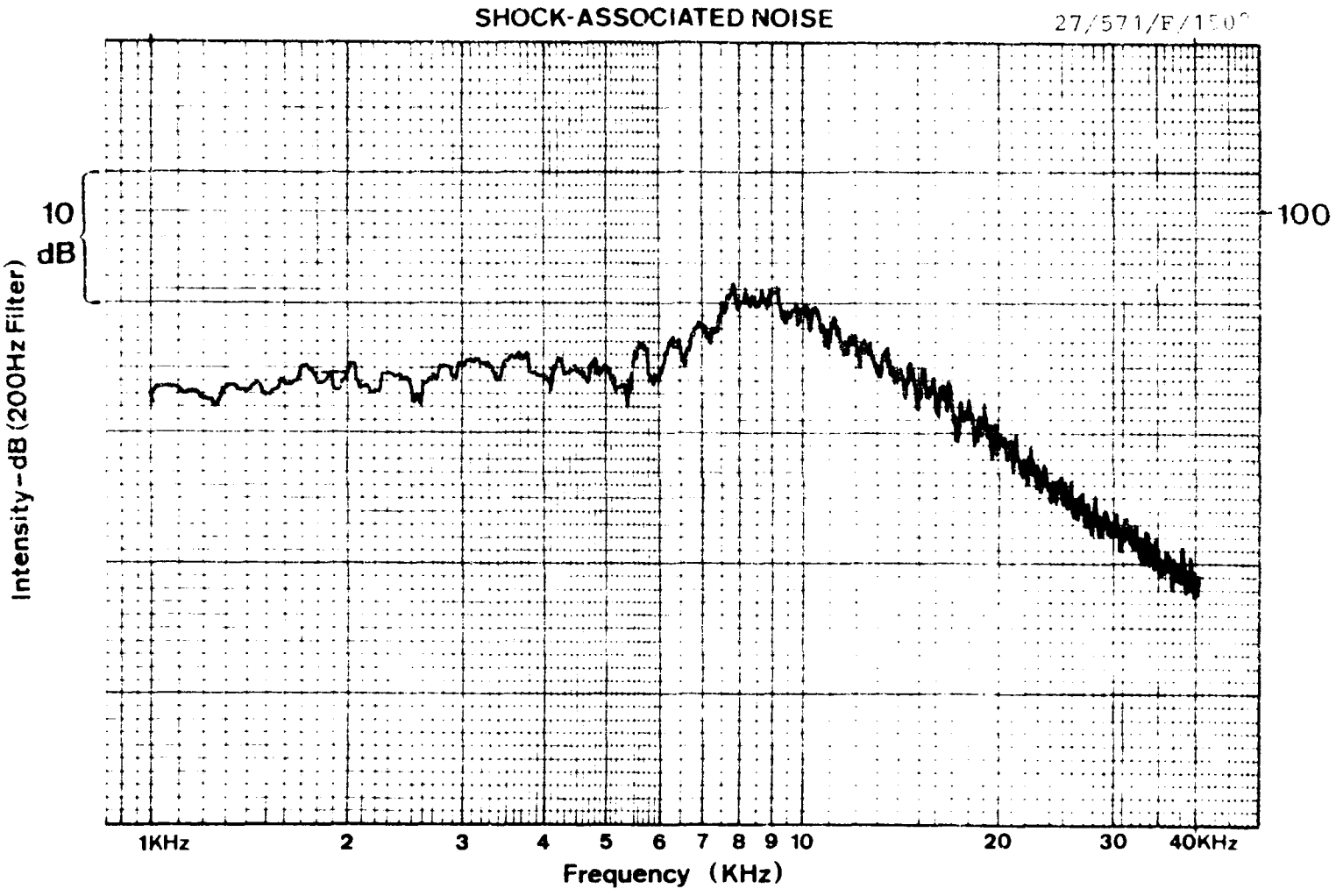
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
10 dB
100
Intensity - dB (200Hz Filter)
1KHz
2
3
4
5
6
7
8
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
27/571/F/150°
10
dB
100
Intensity - dB (200Hz Filter)
1KHz
2
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9
10
20
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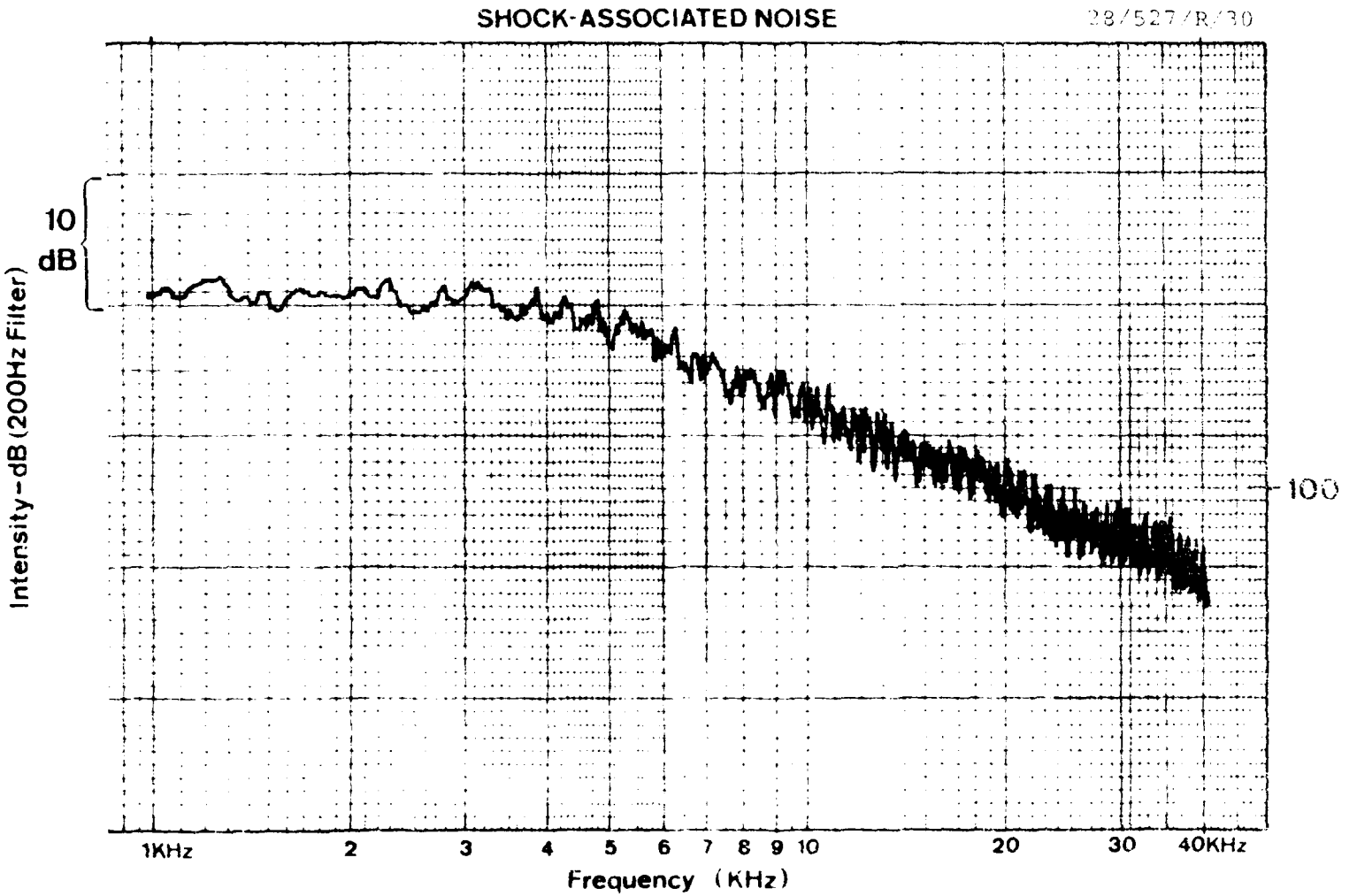
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
28/527/R/30
10
dB
Intensity-dB (200Hz Filter)
100
1KHz
2
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4
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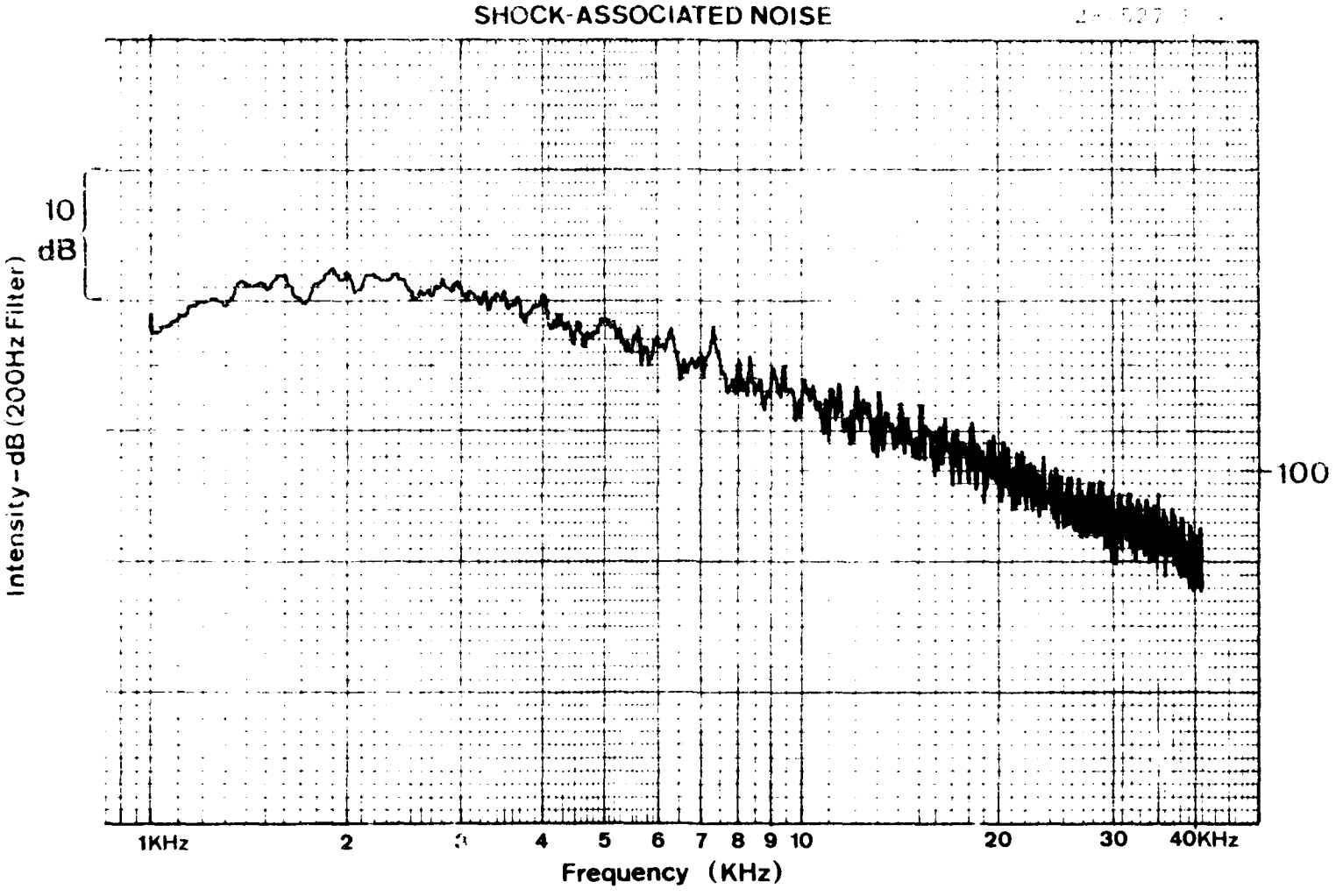
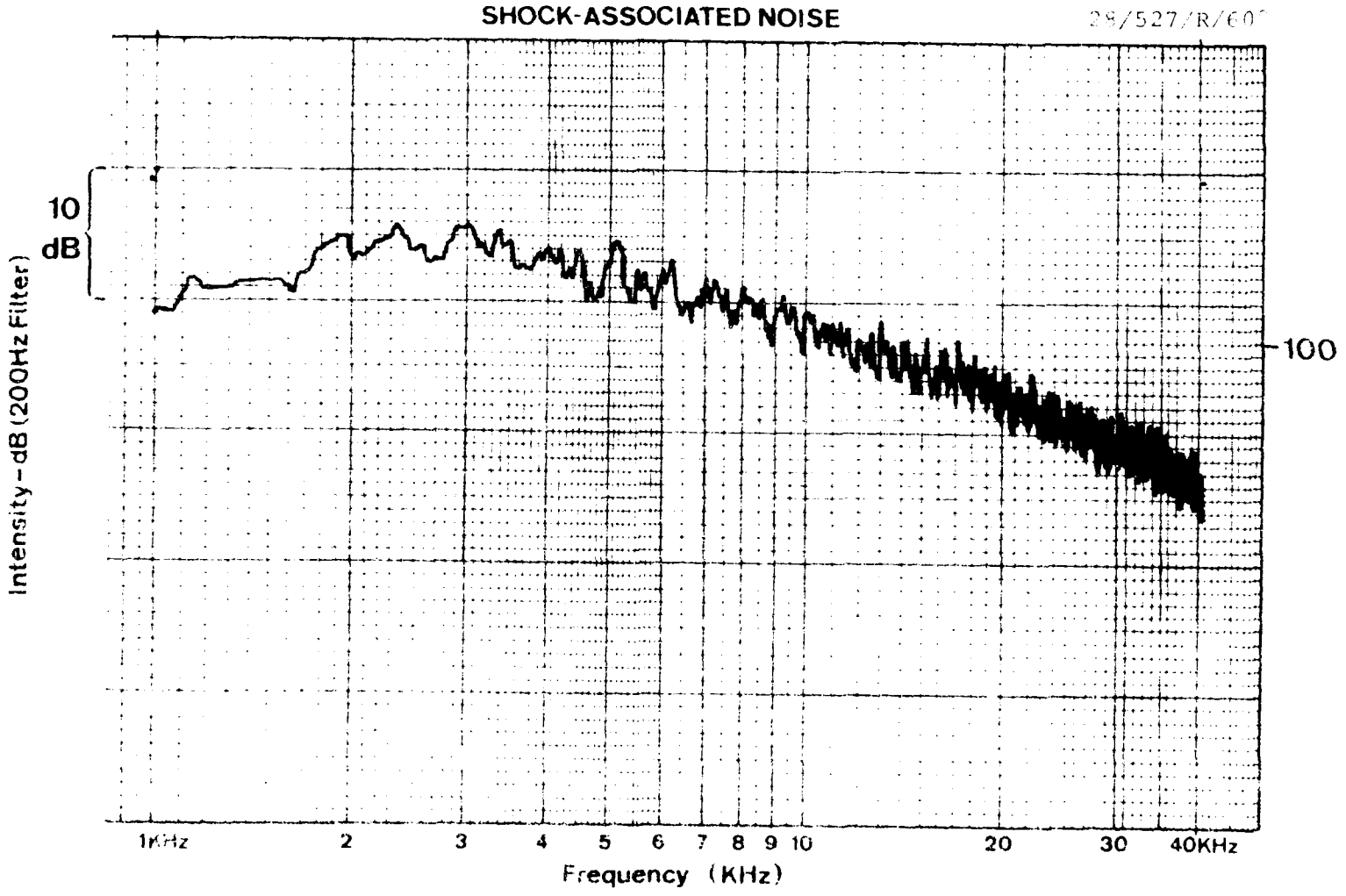
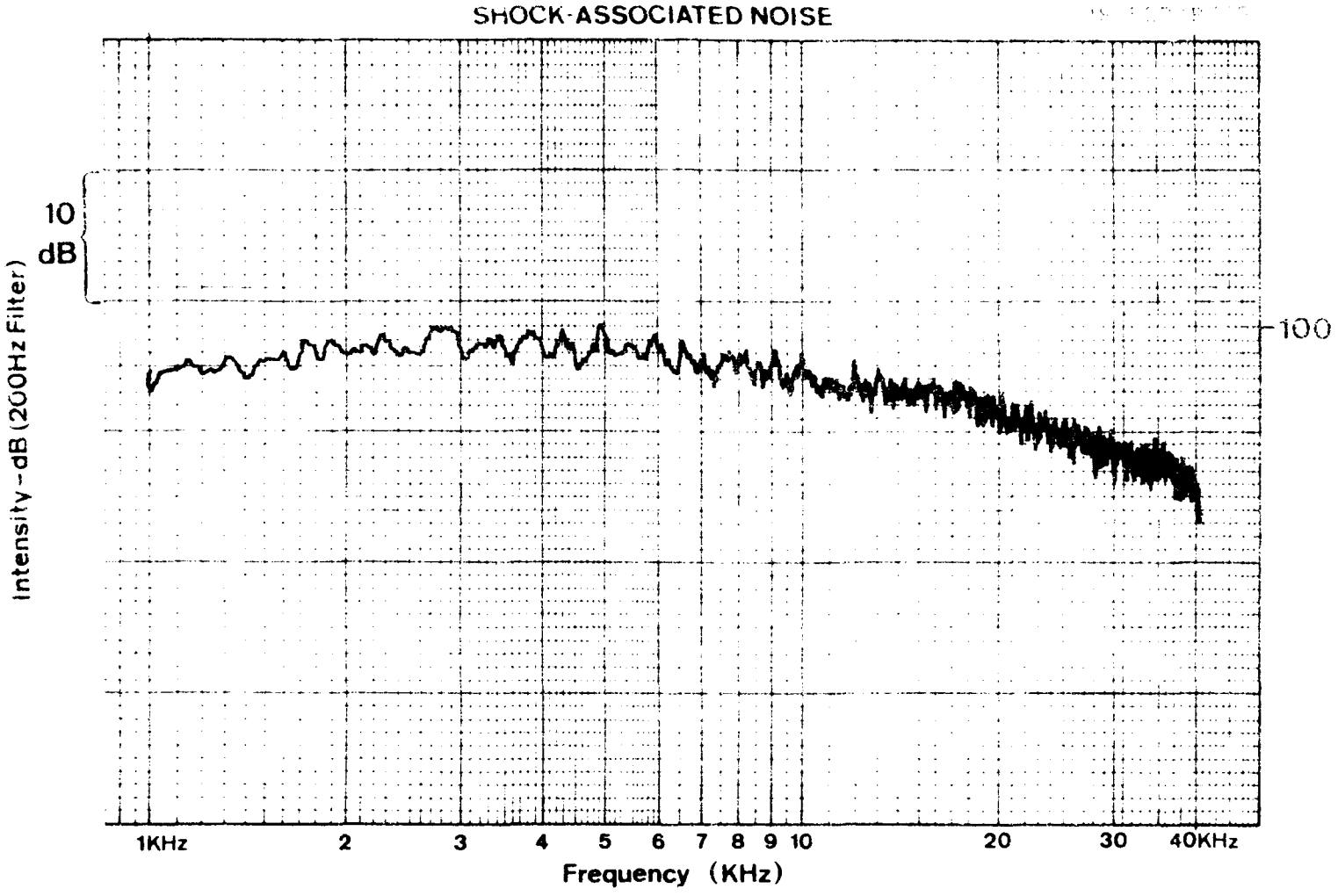
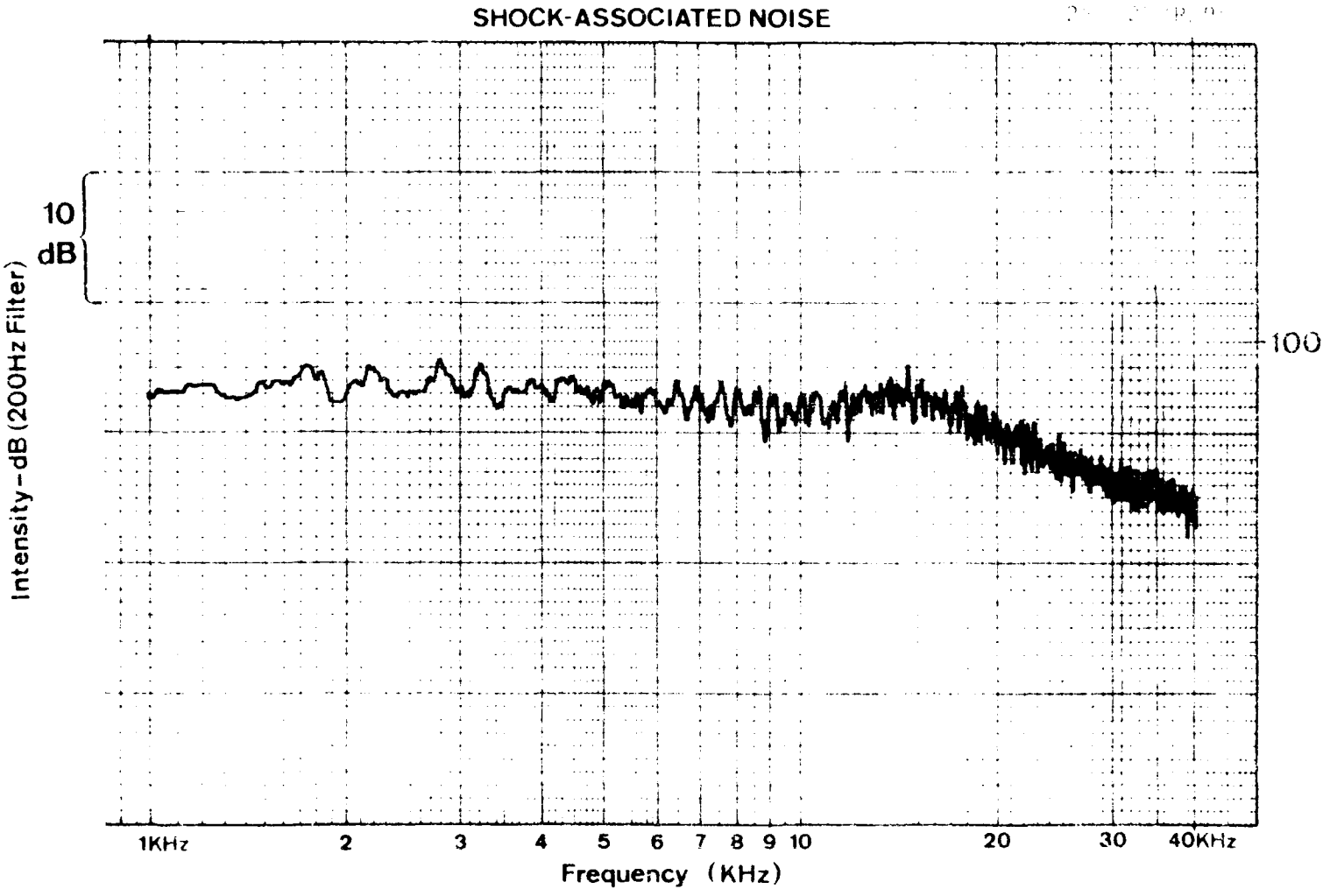
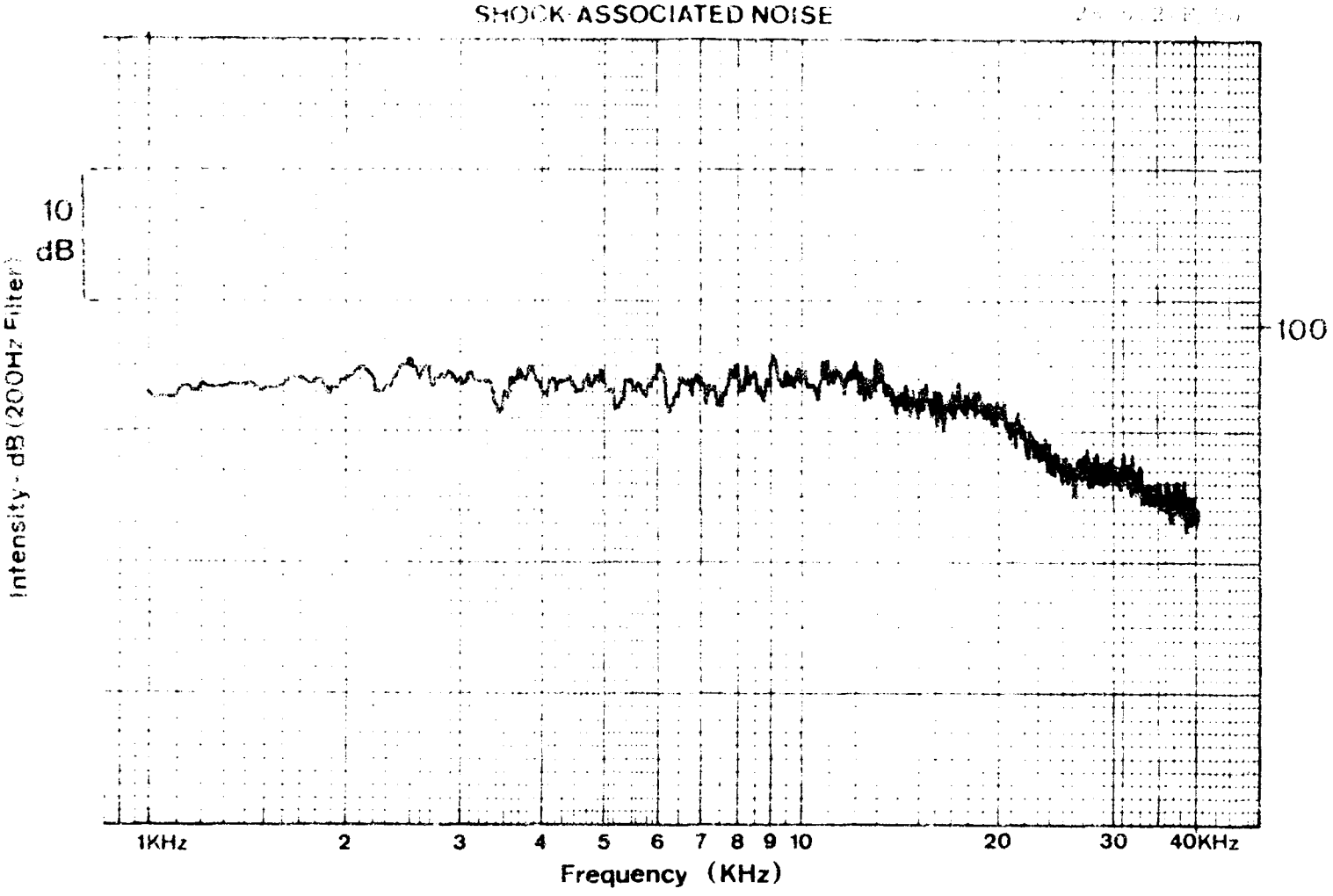
6
7
8
9
10
20
30
40KHz
Frequency (KHz)

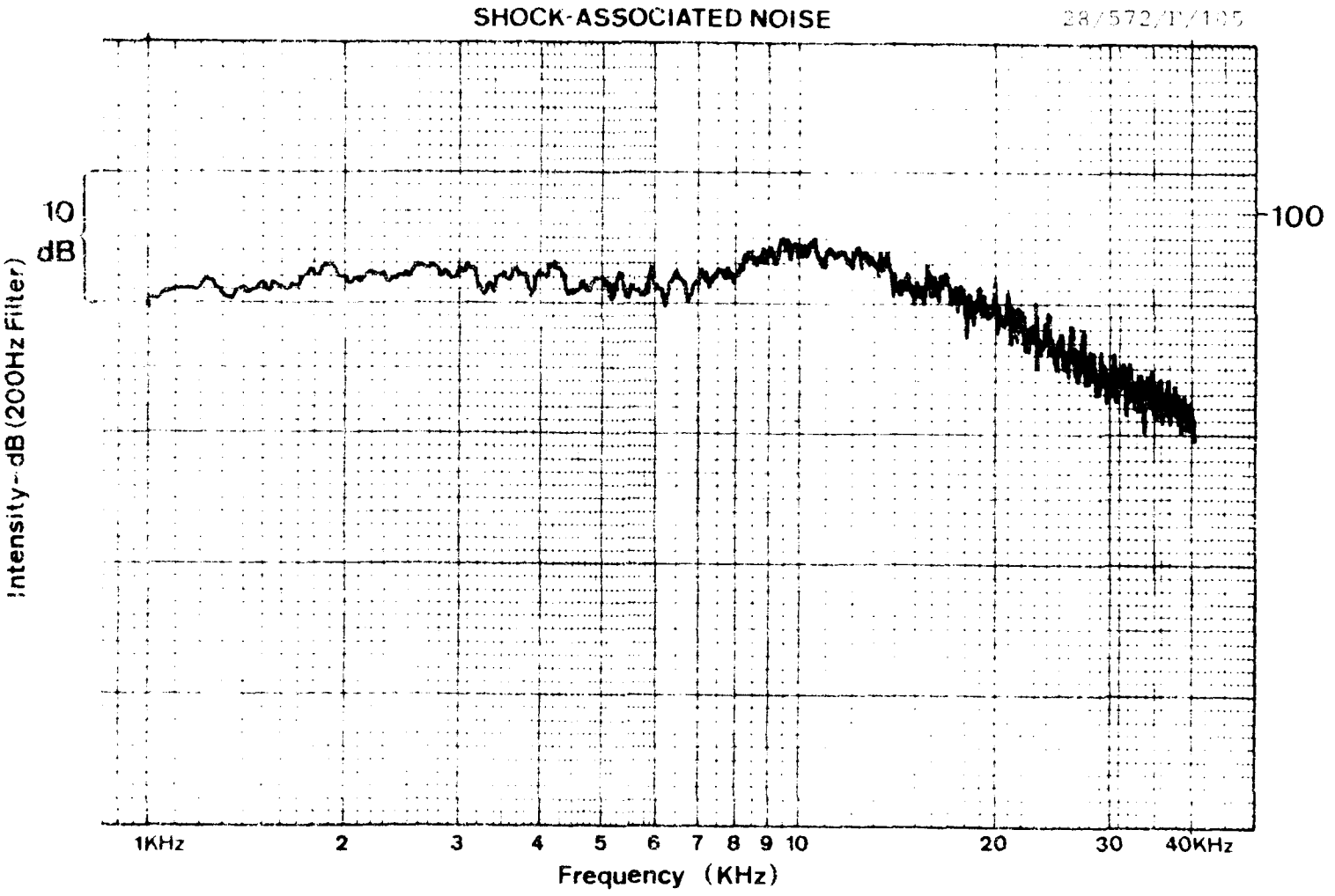

SHOCK-ASSOCIATED NOISE
10
dB
Intensity - dB (200Hz Filter)
100
1KHz
2
3
4
5
6
7
8
9
10
20
30
40KHz
Frequency (KHz)

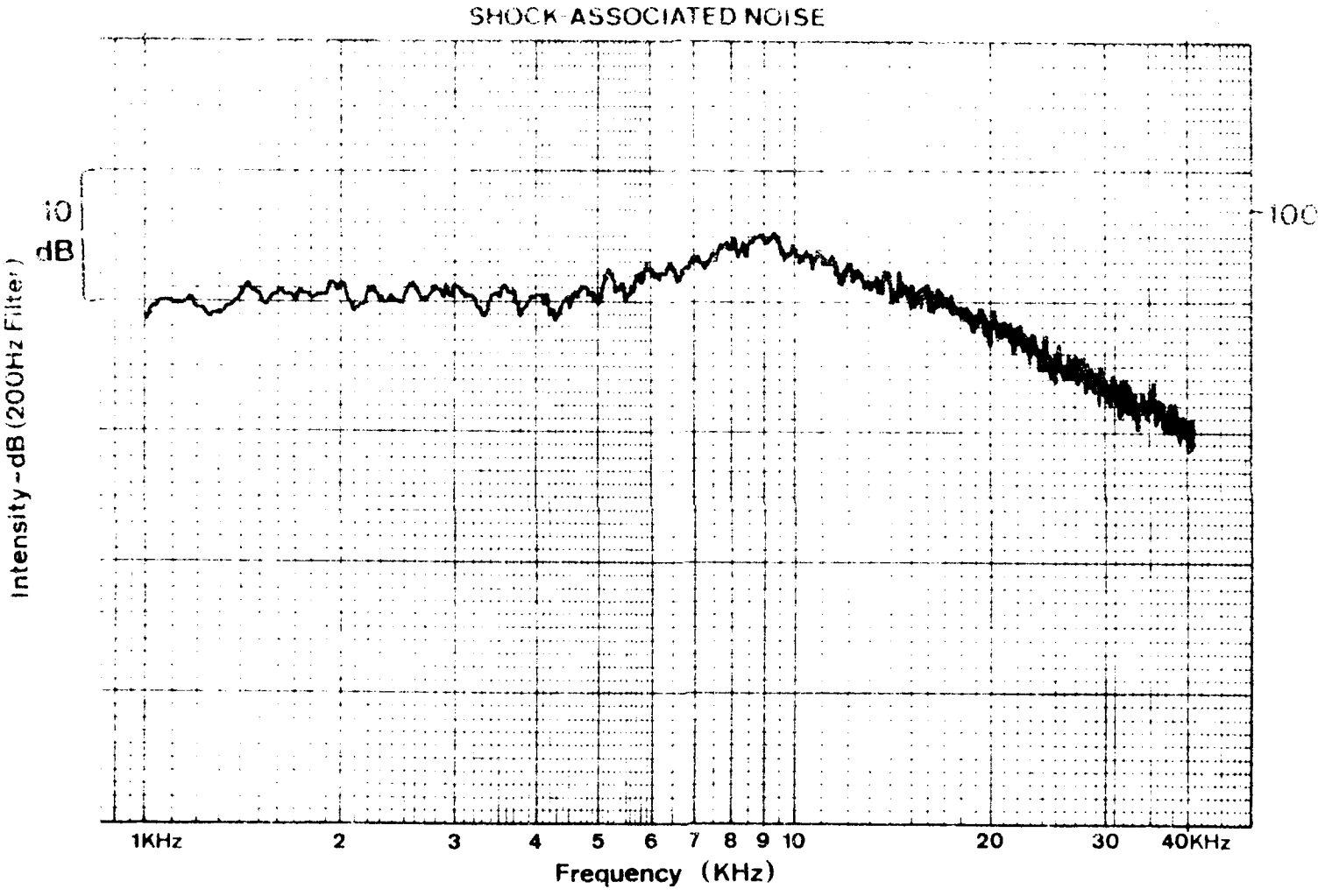

SHOCK-ASSOCIATED NOISE
28/527/R/60
10
dB
Intensity - dB (200Hz Filter)
100
1KHz
2
3
4
5
6
7
8
9
10
20
30
40KHz
Frequency (KHz)

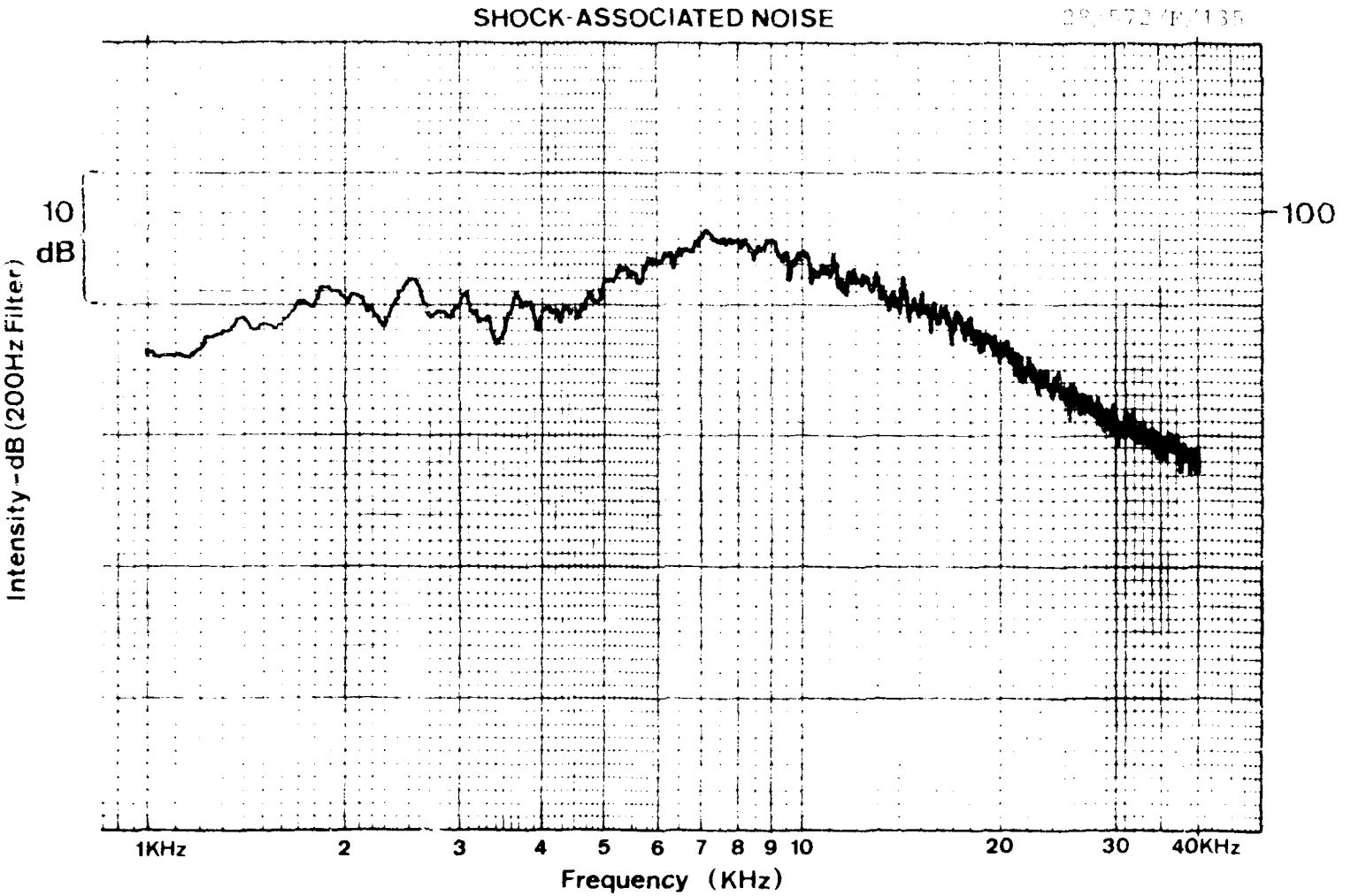

SHOCK-ASSOCIATED NOISE
10
dB
Intensity - dB (200Hz Filter)
100
1KHz
2
3
4
5
6
7
8
9
10
20
30
40KHz
Frequency (KHz)

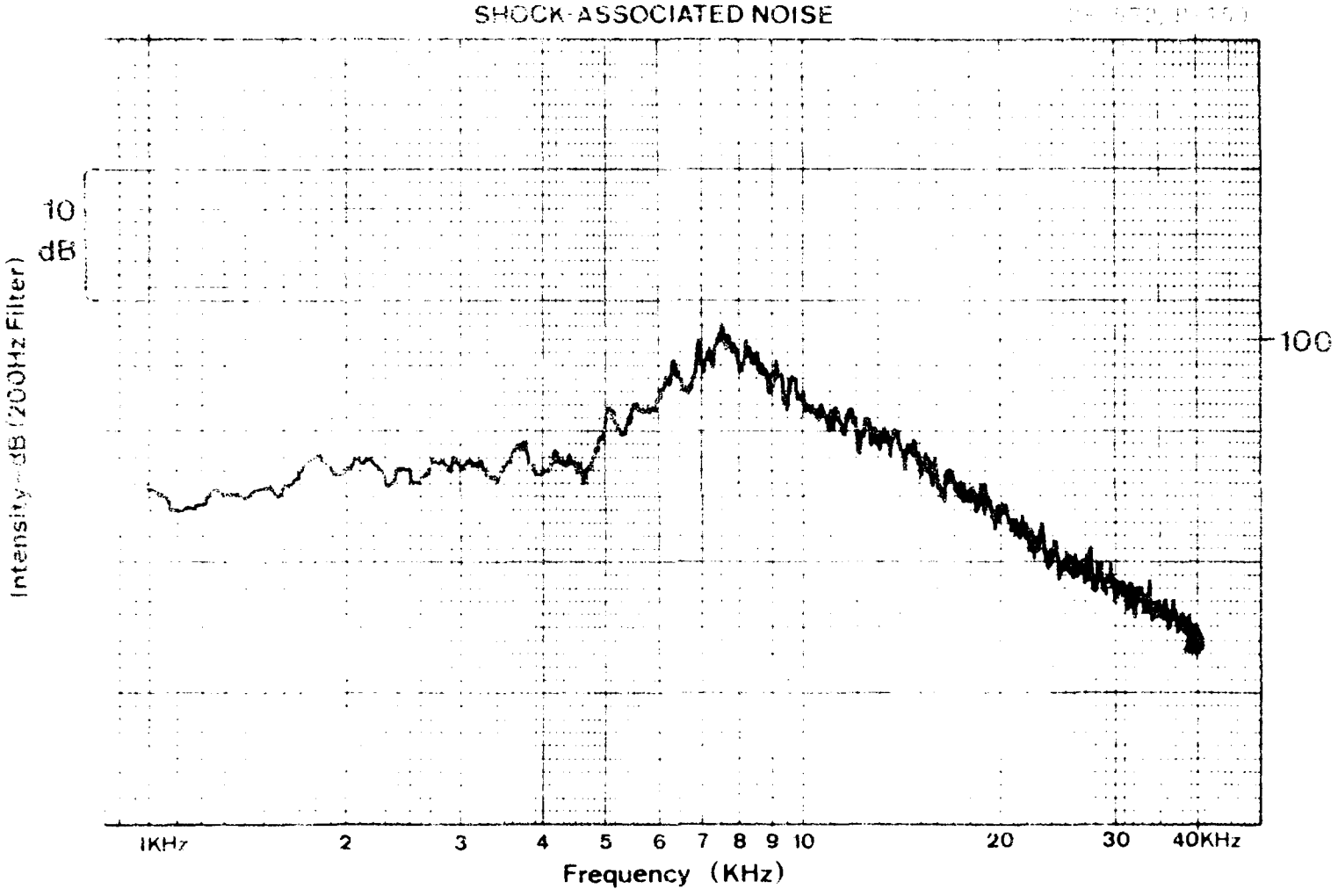

SHOCK-ASSOCIATED NOISE
10
dB
Intensity-dB (200Hz Filter)
100
1KHz
2
3
4
5
6
7
8
9
10
20
30
40KHz
Frequency (KHz)

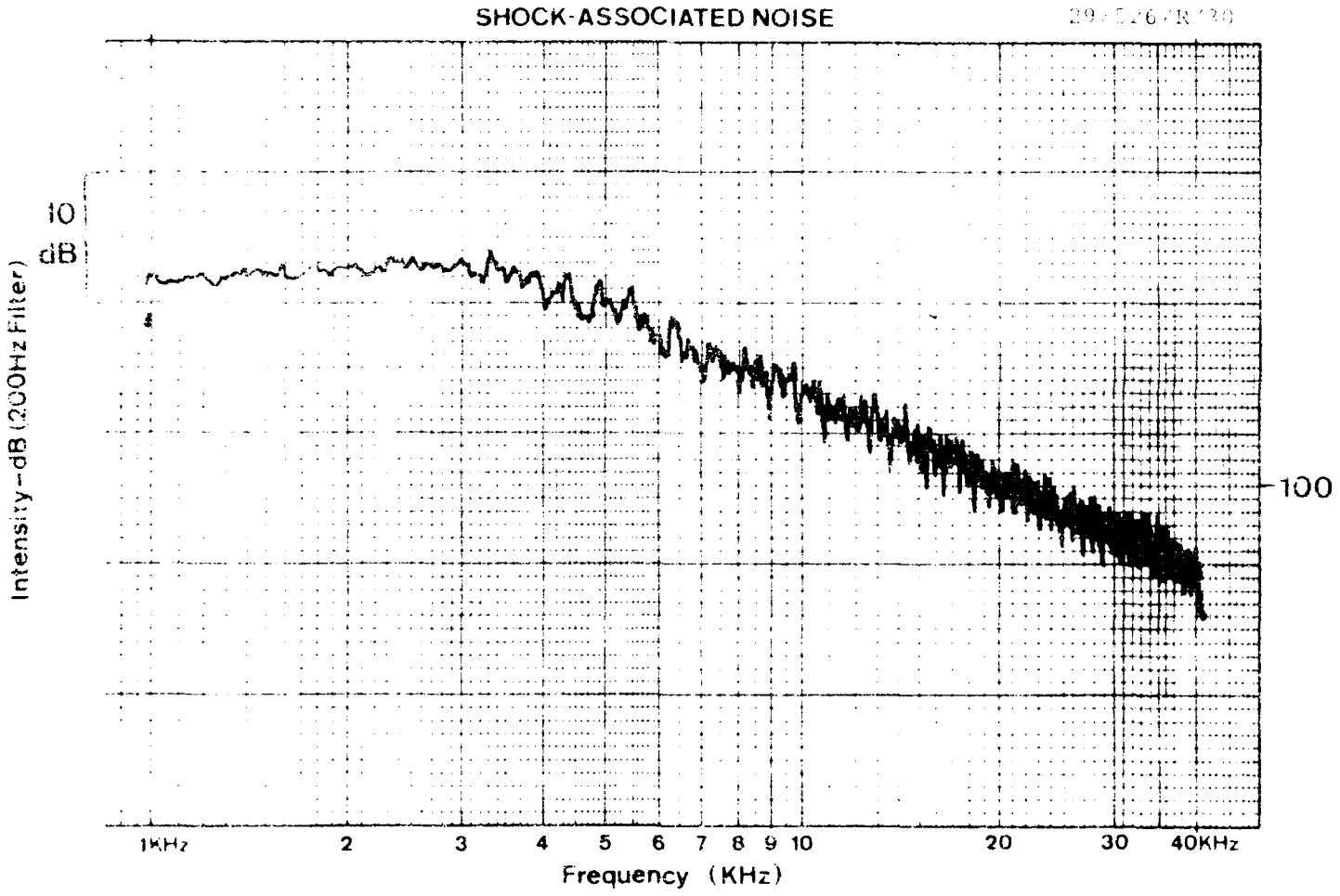

SHOCK ASSOCIATED NOISE
10
dB
Intensity - dB (200Hz Filter)
100
1KHz
2
3
4
5
6
7
8
9
10
20
30
40KHz
Frequency (KHz)

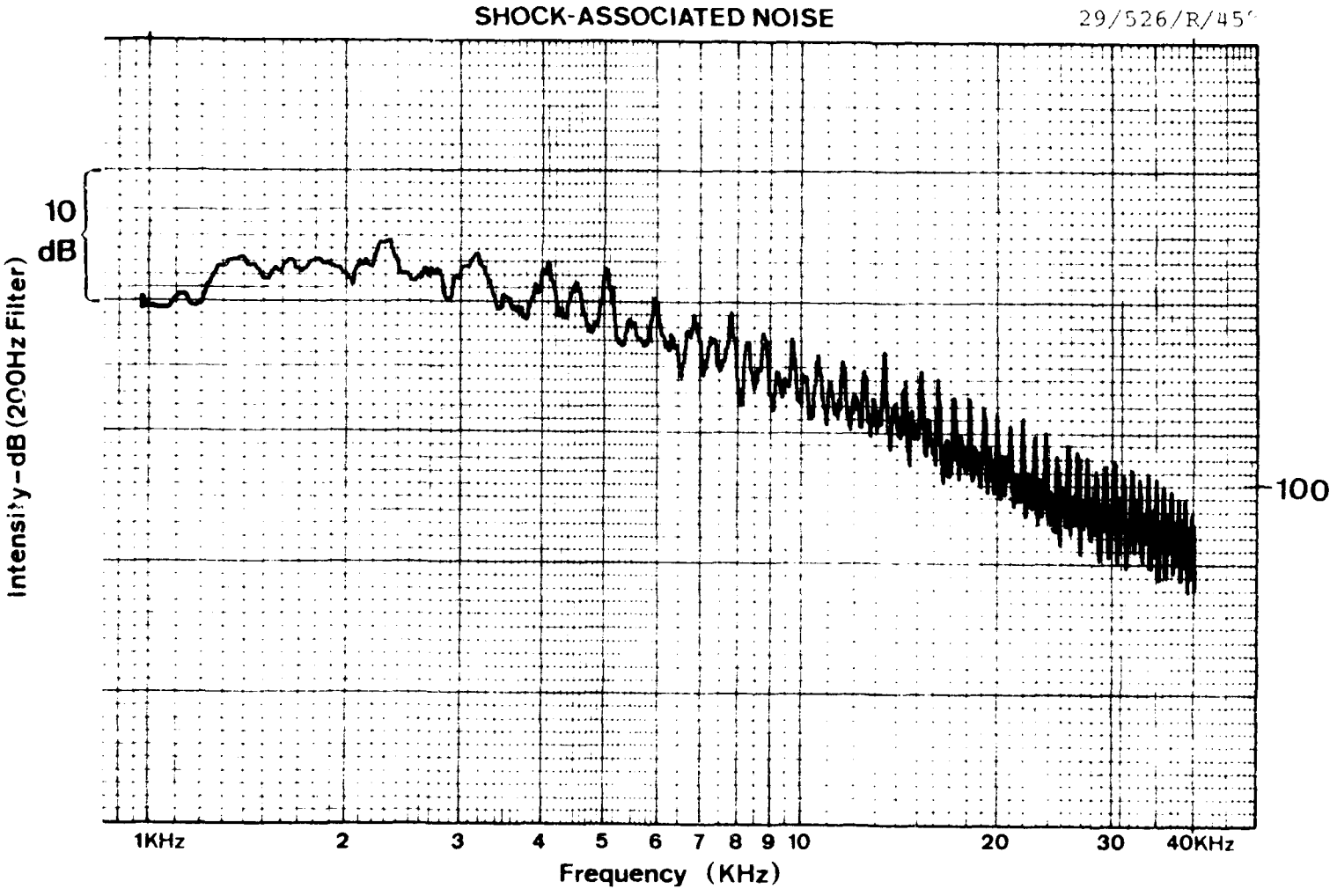

SHOCK-ASSOCIATED NOISE
28/572/1/105
10
dB
100
Intensity - dB (200Hz Filter)
1KHz
2
3
4
5
6
7
8
9
10
20
30
40KHz
Frequency (KHz)

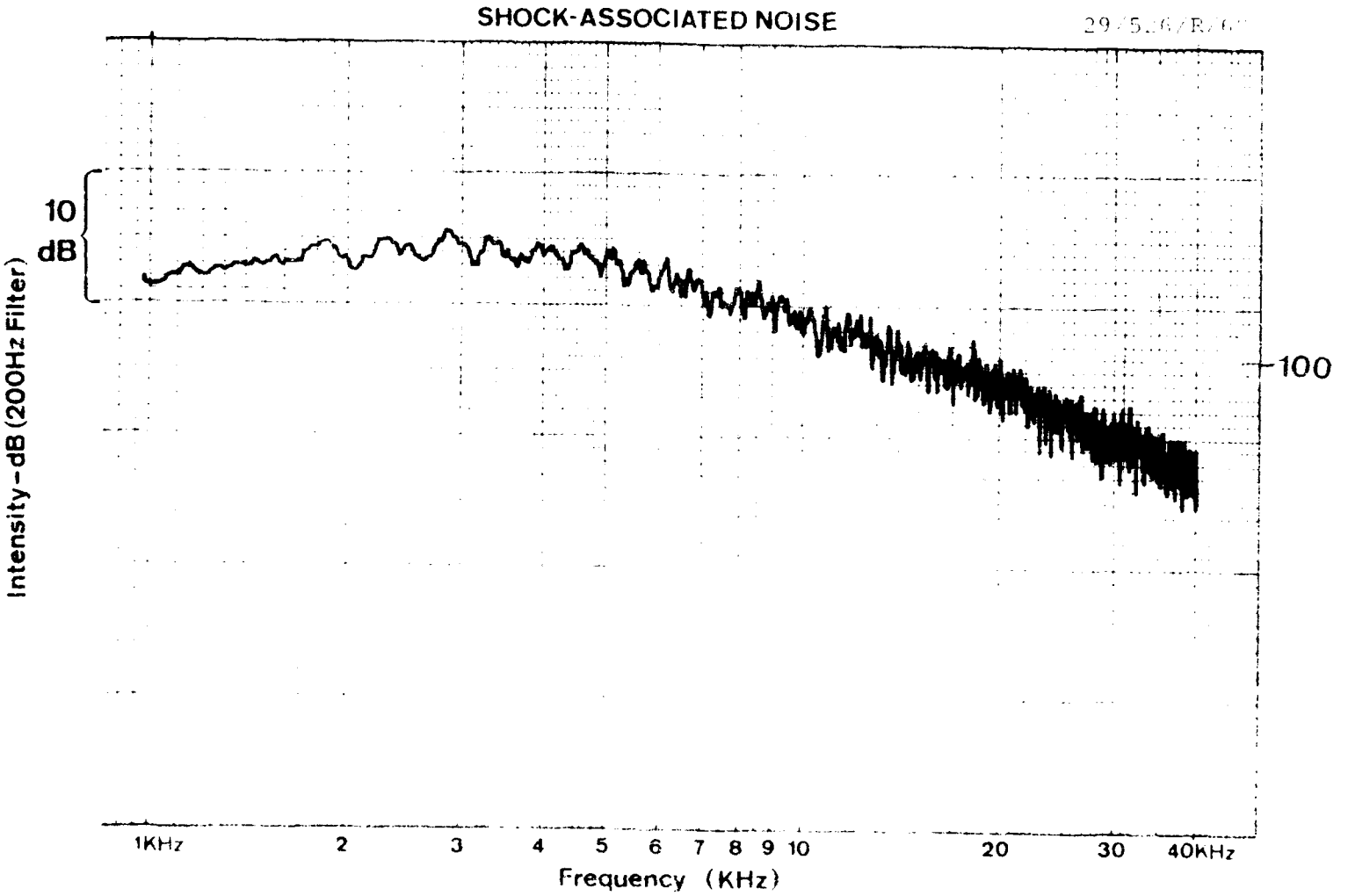

SHOCK ASSOCIATED NOISE
10
dB
100
Intensity - dB (200Hz Filter)
1KHz
2
3
4
5
6
7
8
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
10
dB
100
Intensity - dB (200Hz Filter)
1KHz
2
3
4
5
6
7
8
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
10
dB
Intensity - dB (20Hz Filter)
100
1KHz
2
3
4
5
6
7
8
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
10
dB
Intensity-dB (200Hz Filter)
100
1KHz
2
3
4
5
6
7
8
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
29/526/R/45
10
dB
Intensity-dB (200Hz Filter)
100
1KHz
2
3
4
5
6
7
8
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
10
dB
Intensity-dB (200Hz Filter)
100
1KHz
2
3
4
5
6
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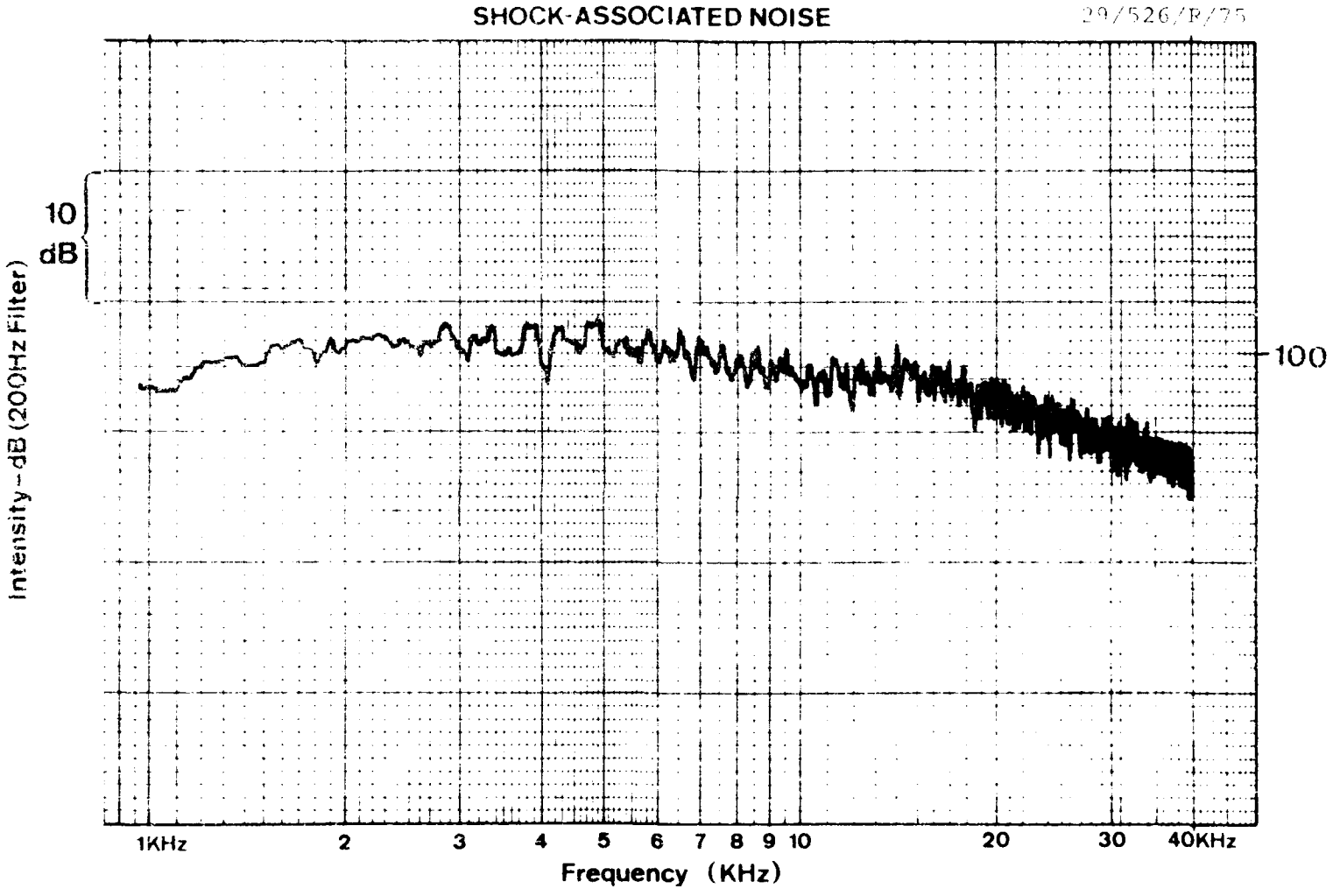
9
10
20
30
40kHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
29/526/R/75
10
dB
Intensity - dB (200Hz Filter)
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1KHz
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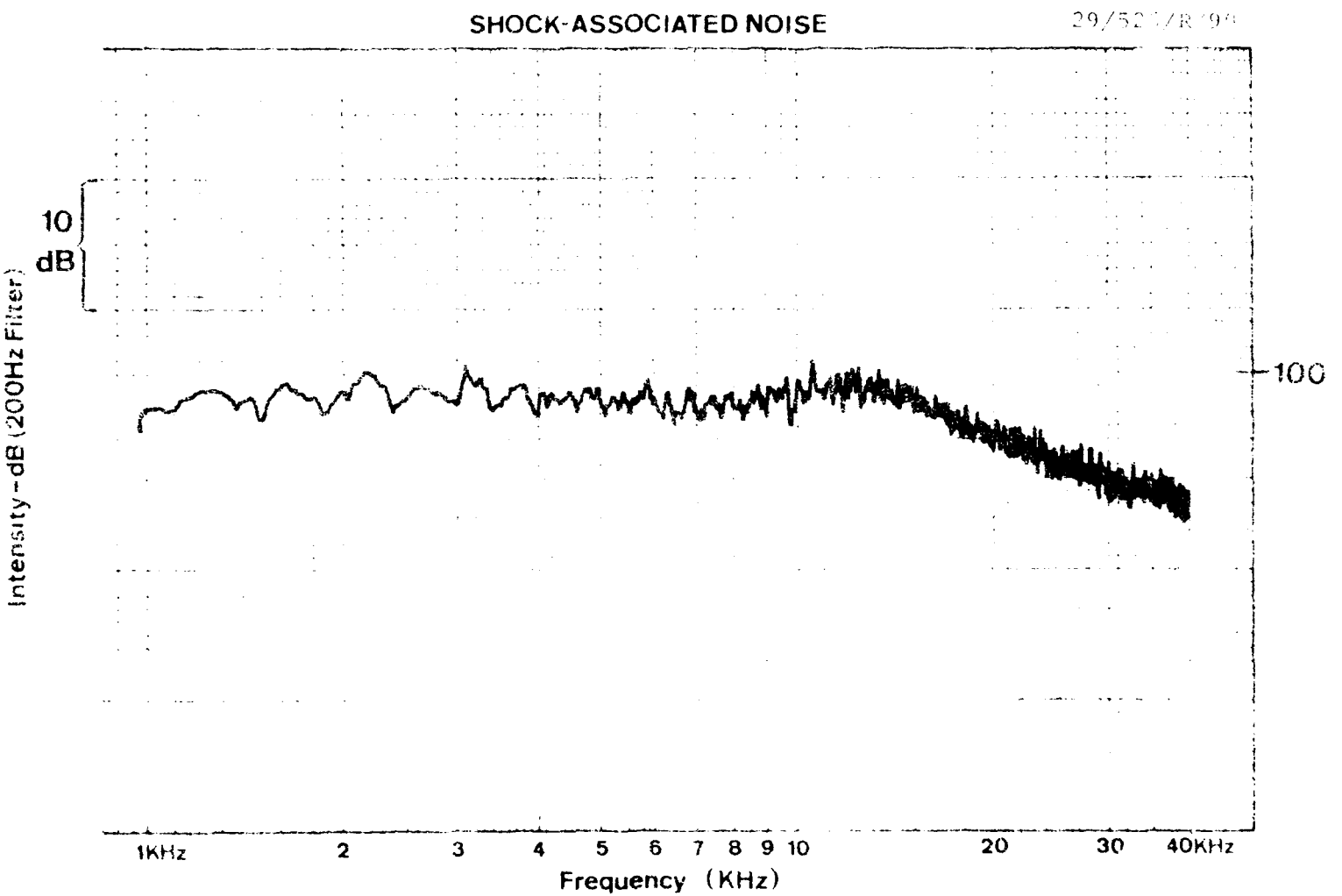
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
10
dB
Intensity - dB (200Hz Filter)
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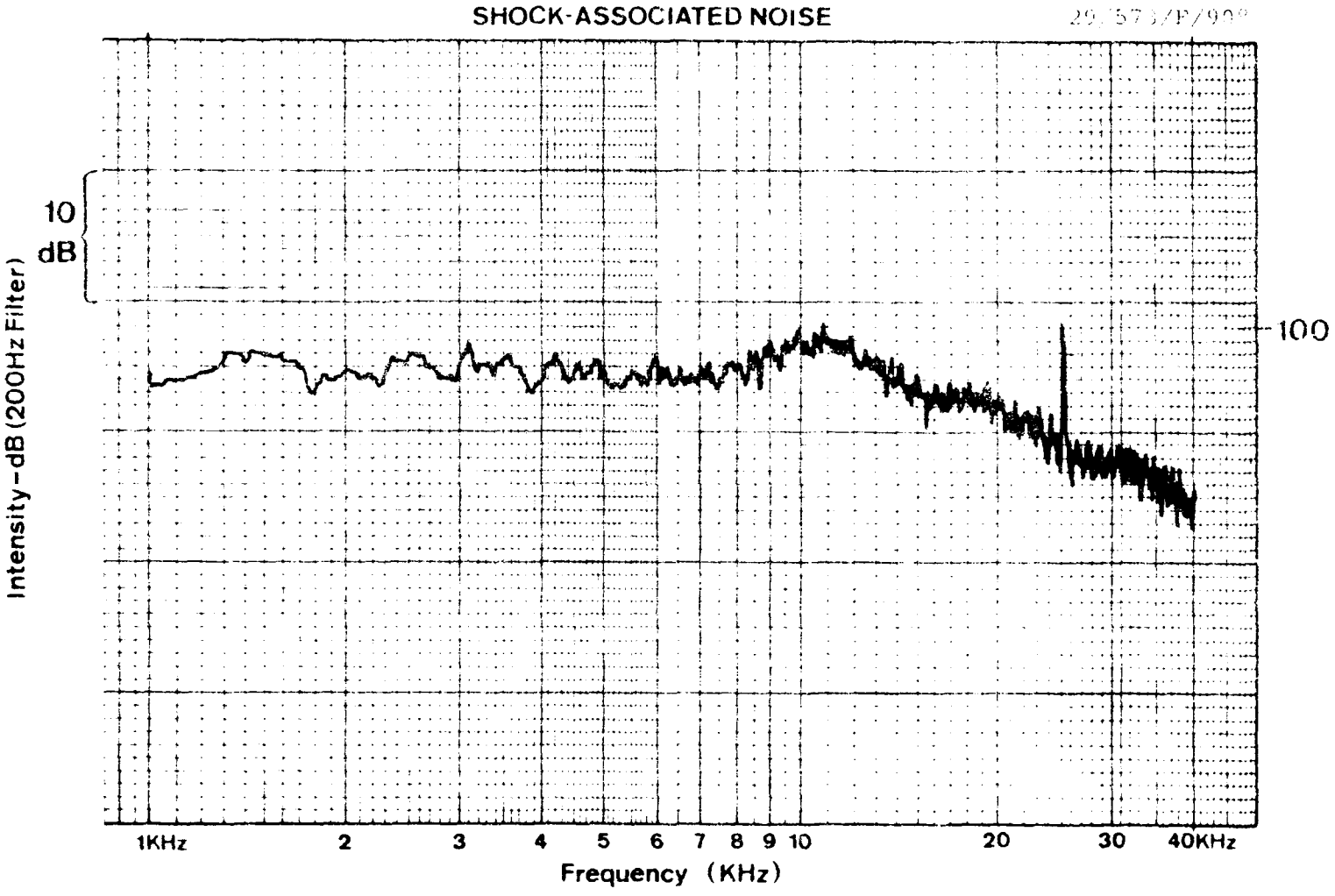
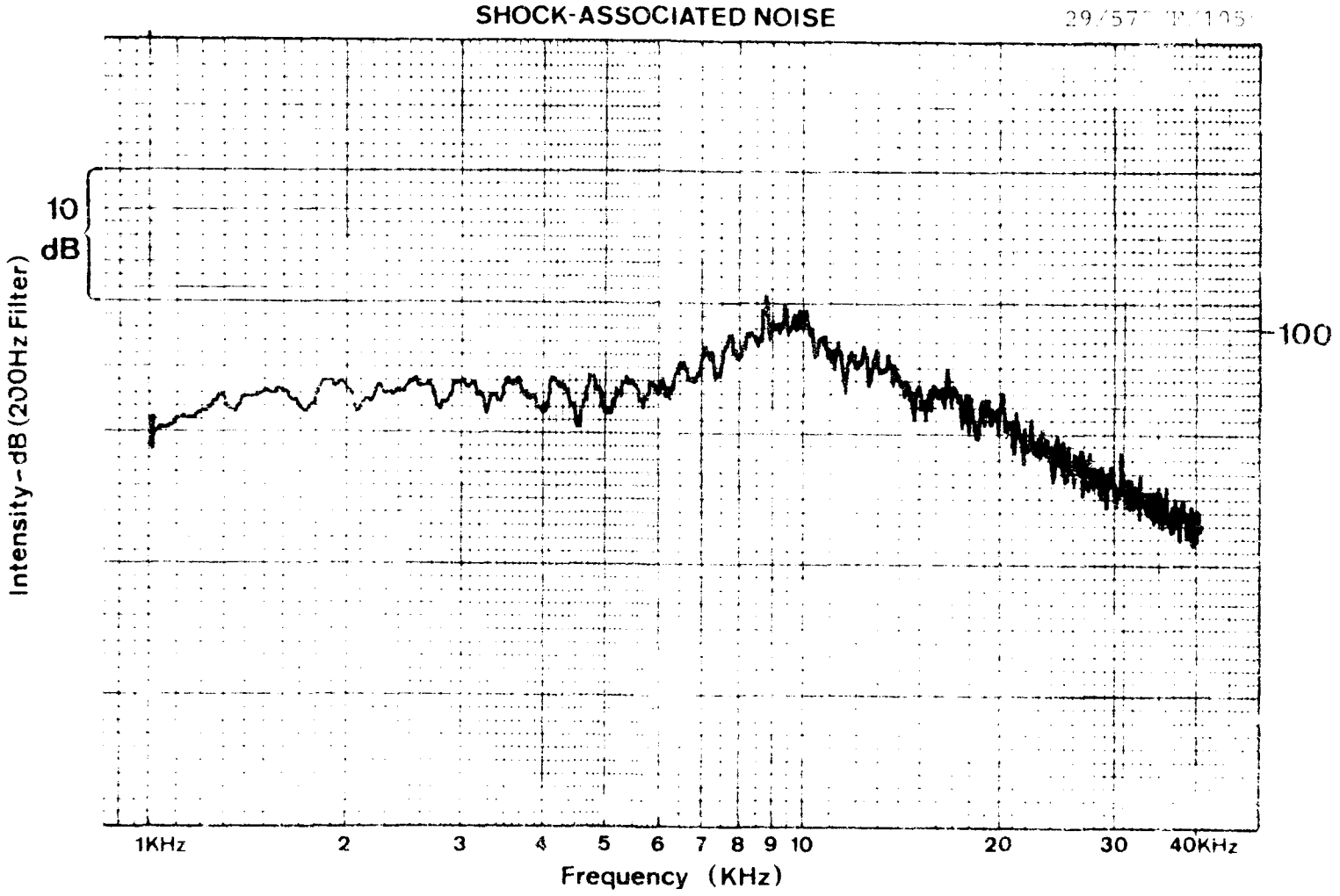
1KHz
2
3
4
5
6
7
8
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
10
dB
Intensity - dB (200Hz Filter)
100
1KHz
2
3
4
5
6
7
8
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
10
dB
Intensity - dB (200Hz Filter)
100
1KHz
2
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4
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6
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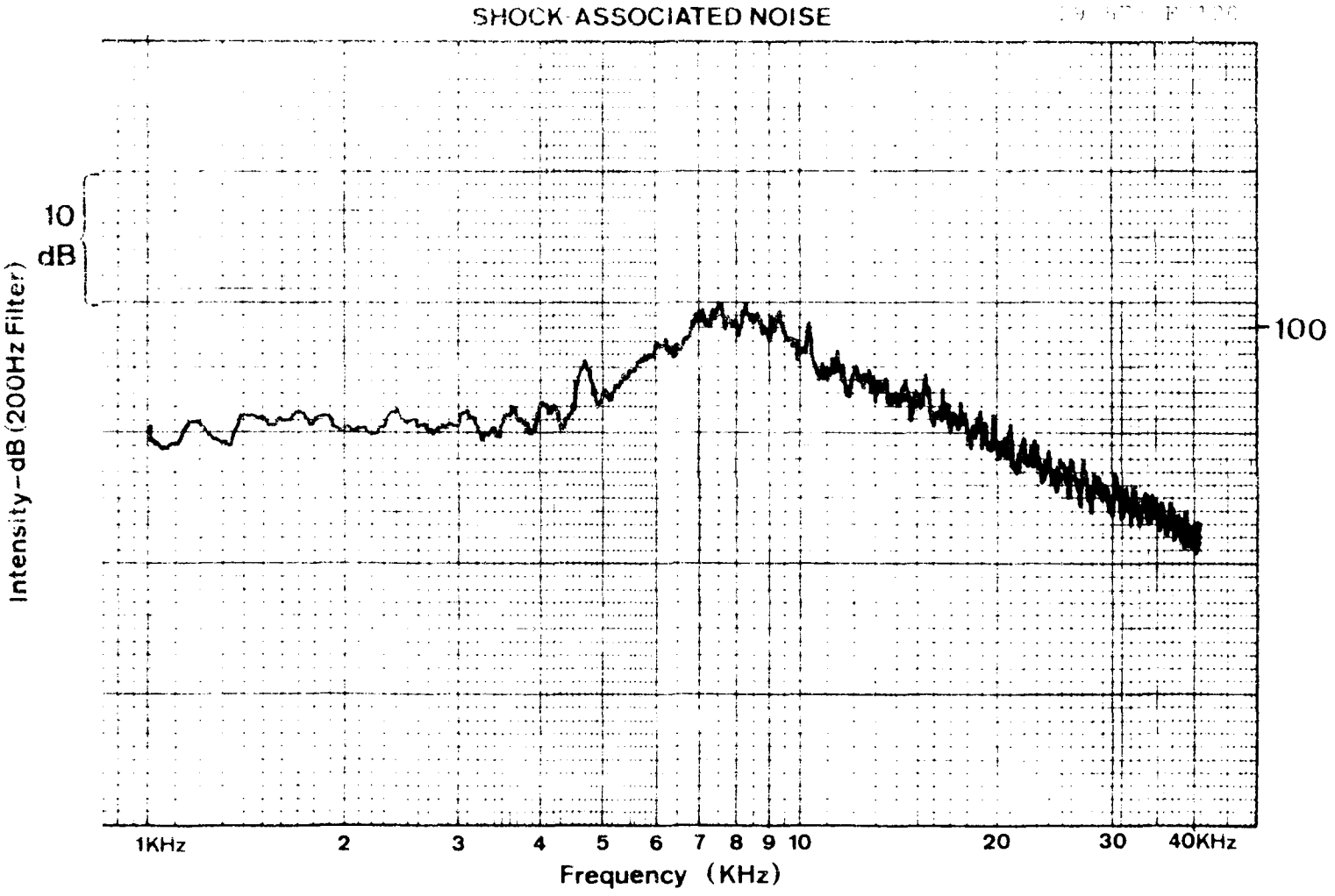
9
10
20
30
40KHz
Frequency (KHz)


SHOCK ASSOCIATED NOISE
10
dB
Intensity–dB (200Hz Filter)
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1KHz
2
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4
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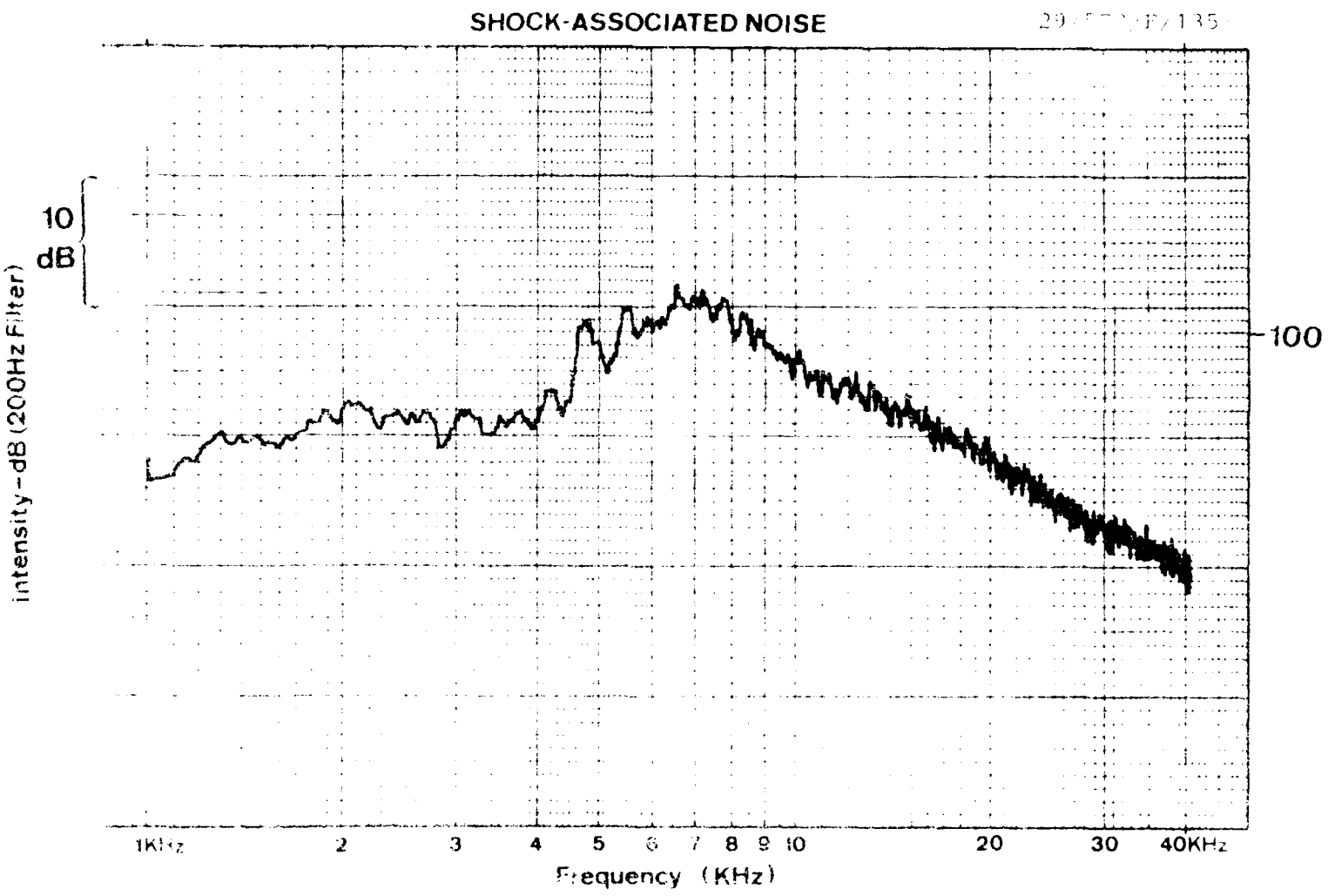
6
7
8
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
10
dB
Intensity - dB (200Hz Filter)
100
1KHz
2
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4
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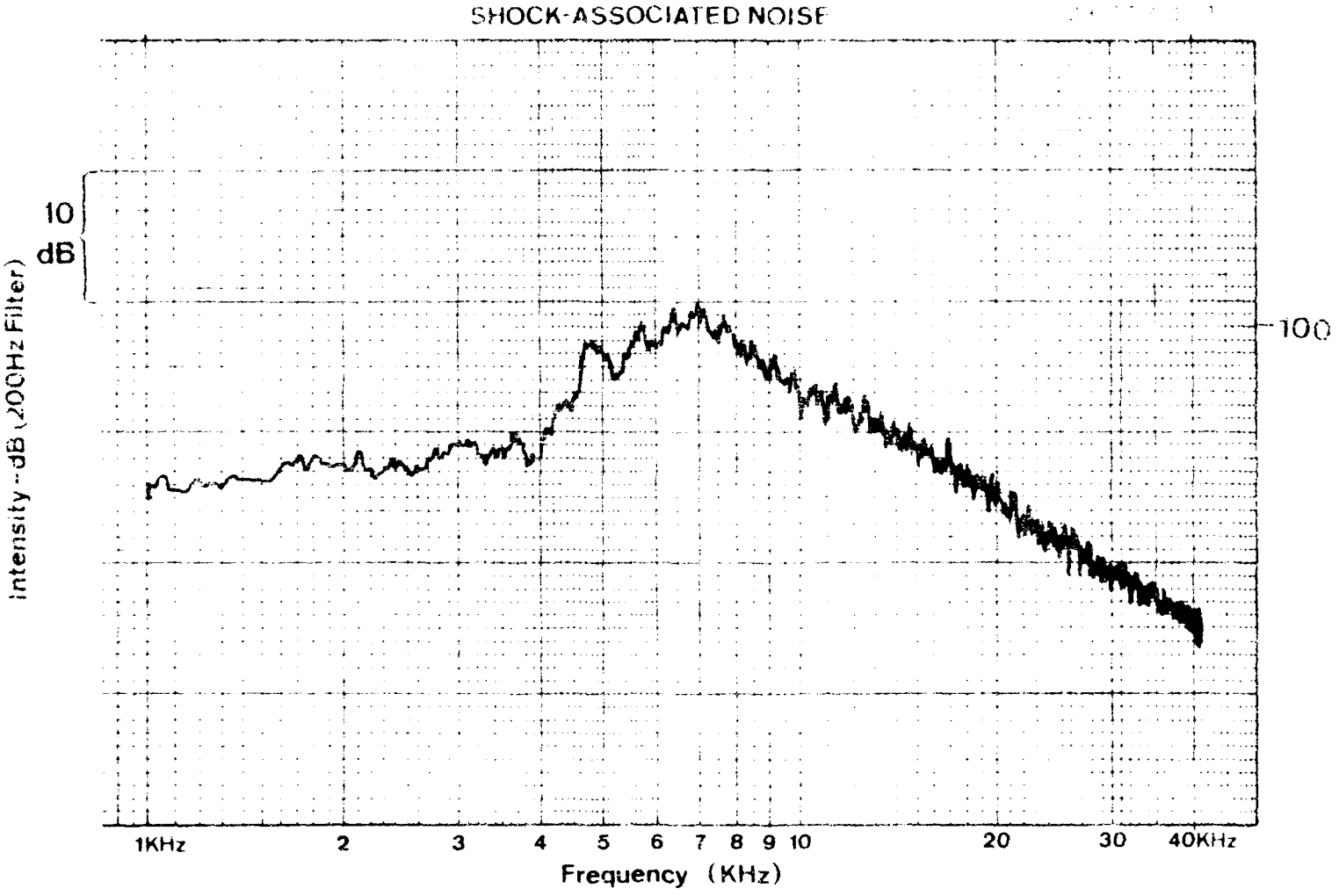
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
10
dB
Intensity - dB (200Hz Filter)
100
1KHz
2
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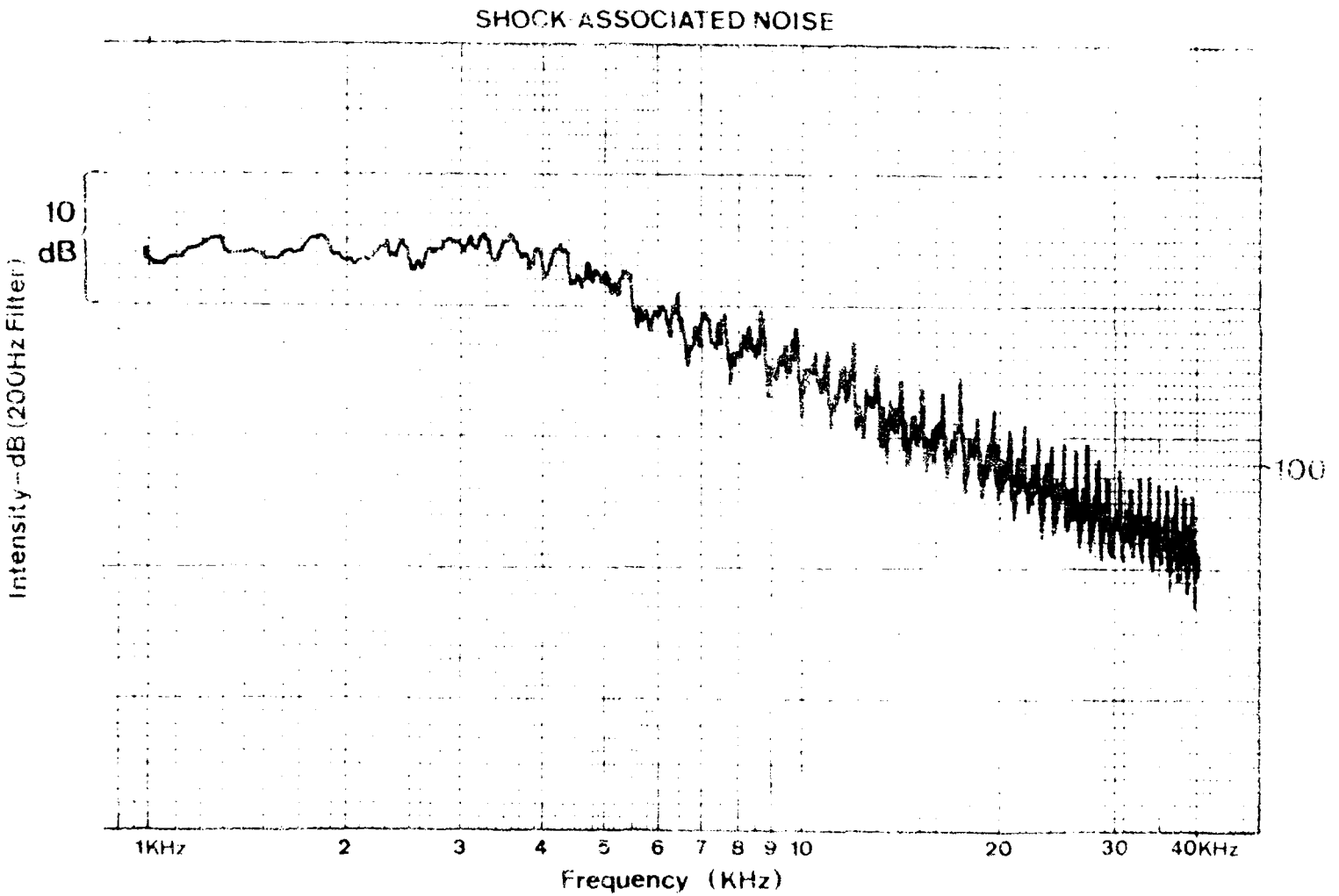
9
10
20
30
40KHz
Frequency (KHz)


SHOCK ASSOCIATED NOISE
10
dB
Intensity - dB (200Hz Filter)
100
1KHz
2
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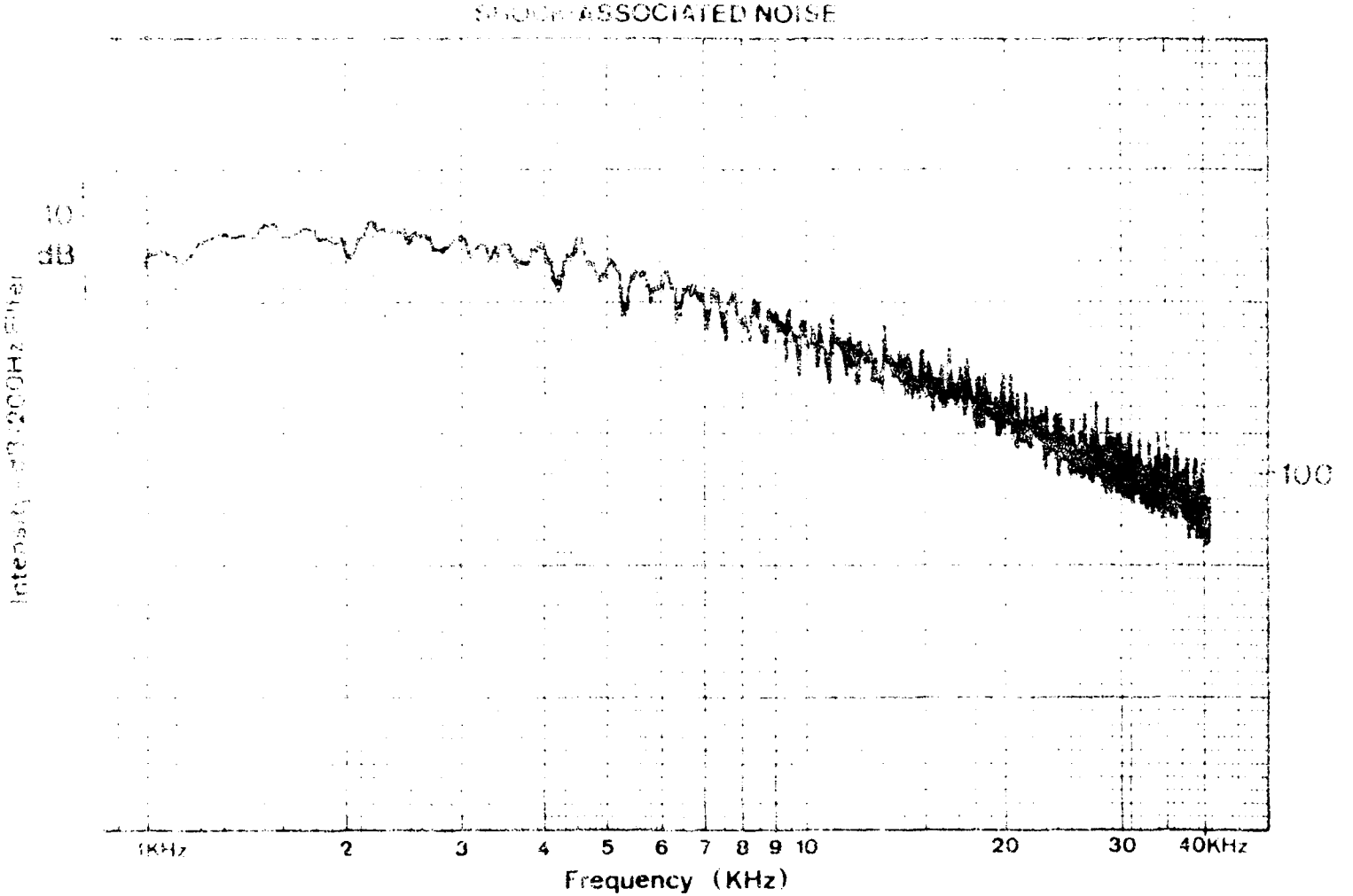
40KHz
Frequency (KHz)


SHOCK ASSOCIATED NOISE
10
dB
100
1KHz
2
3
4
5
6
7
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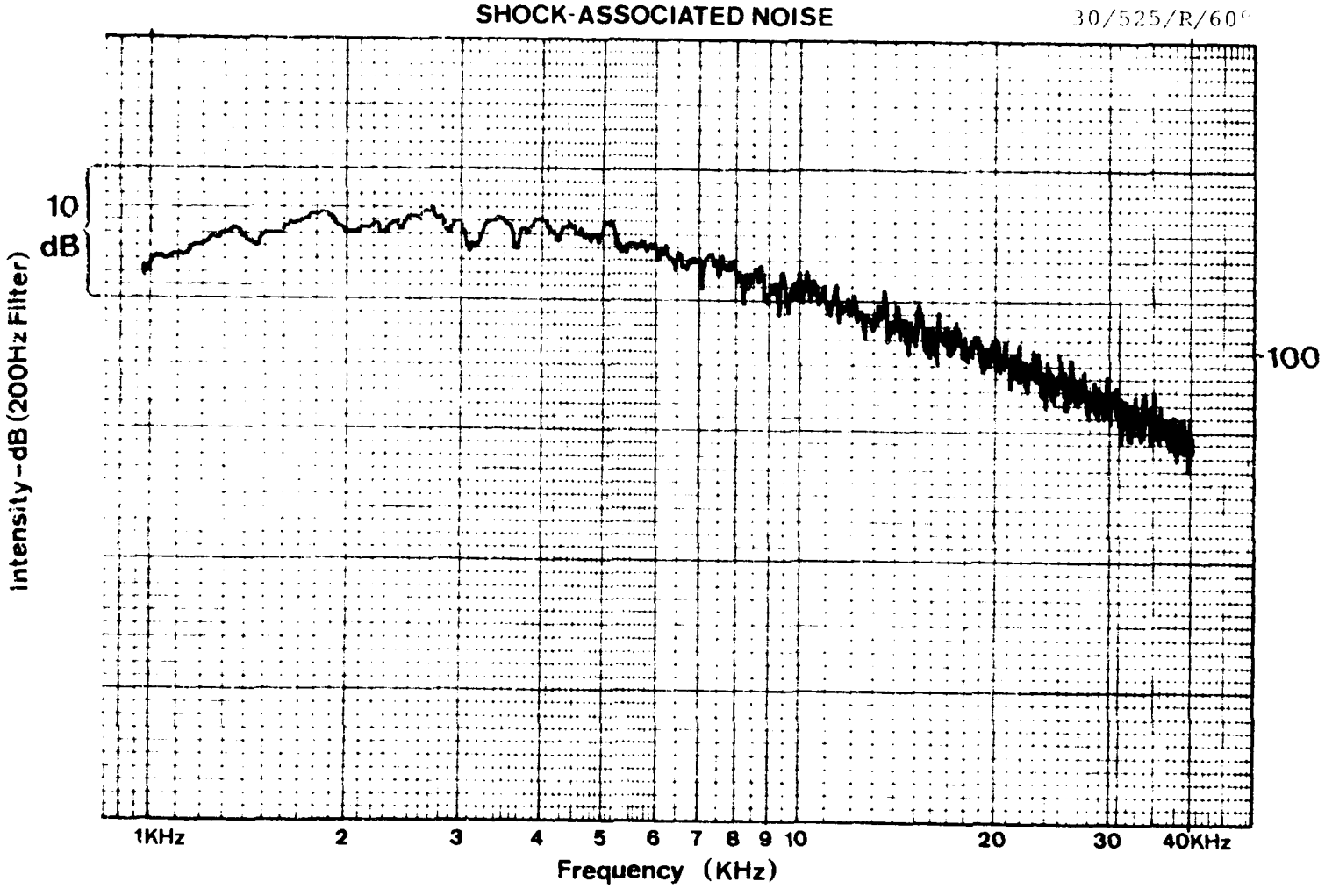
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
30/525/R/60°
10
dB
Intensity-dB (200Hz Filter)
100
1KHz
2
3
4
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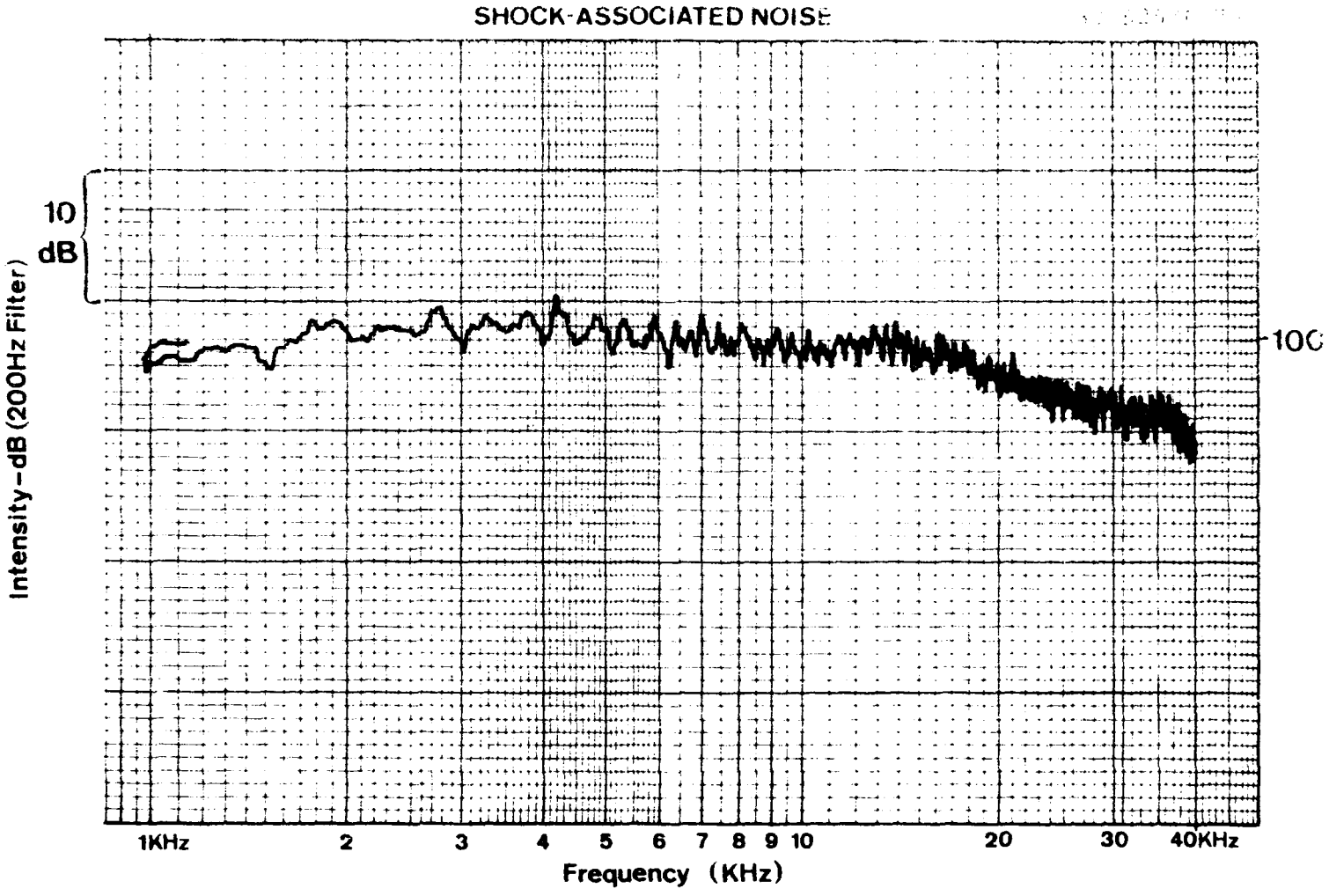
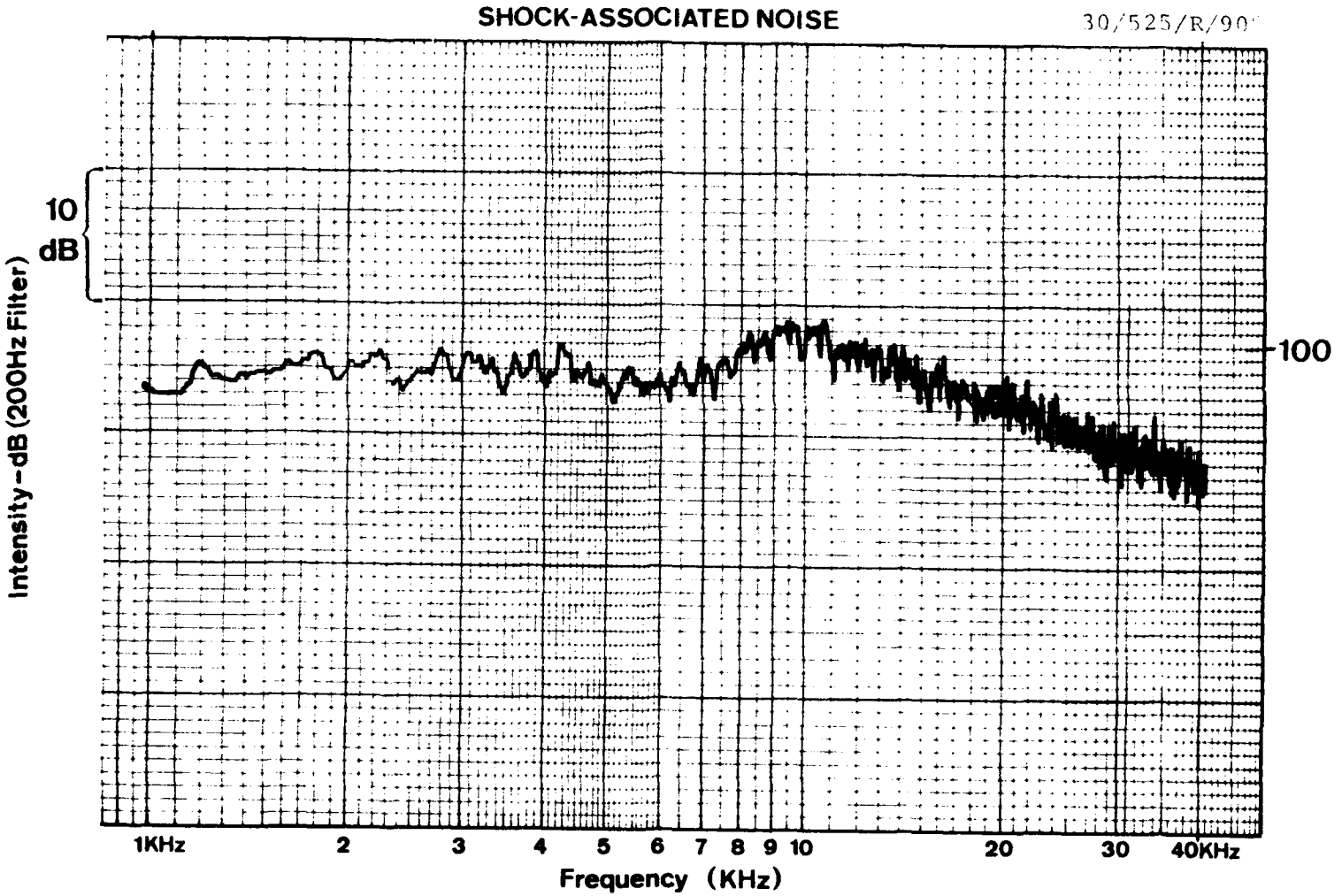
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
10
dB
Intensity-dB (200Hz Filter)
100
1KHz
2
3
4
5
6
7
8
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
30/525/R/90
10
dB
Intensity - dB (200Hz Filter)
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1KHz
2
3
4
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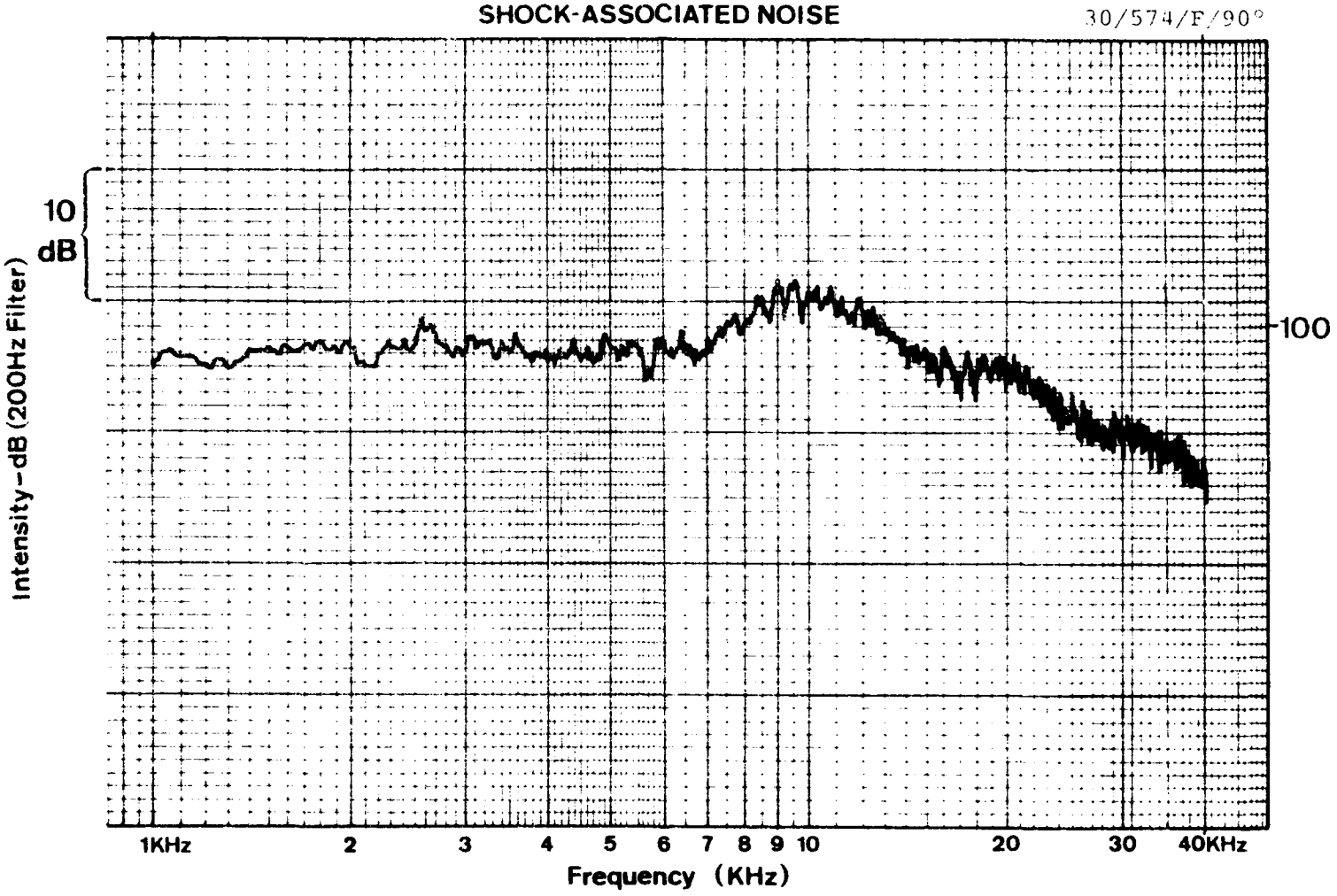
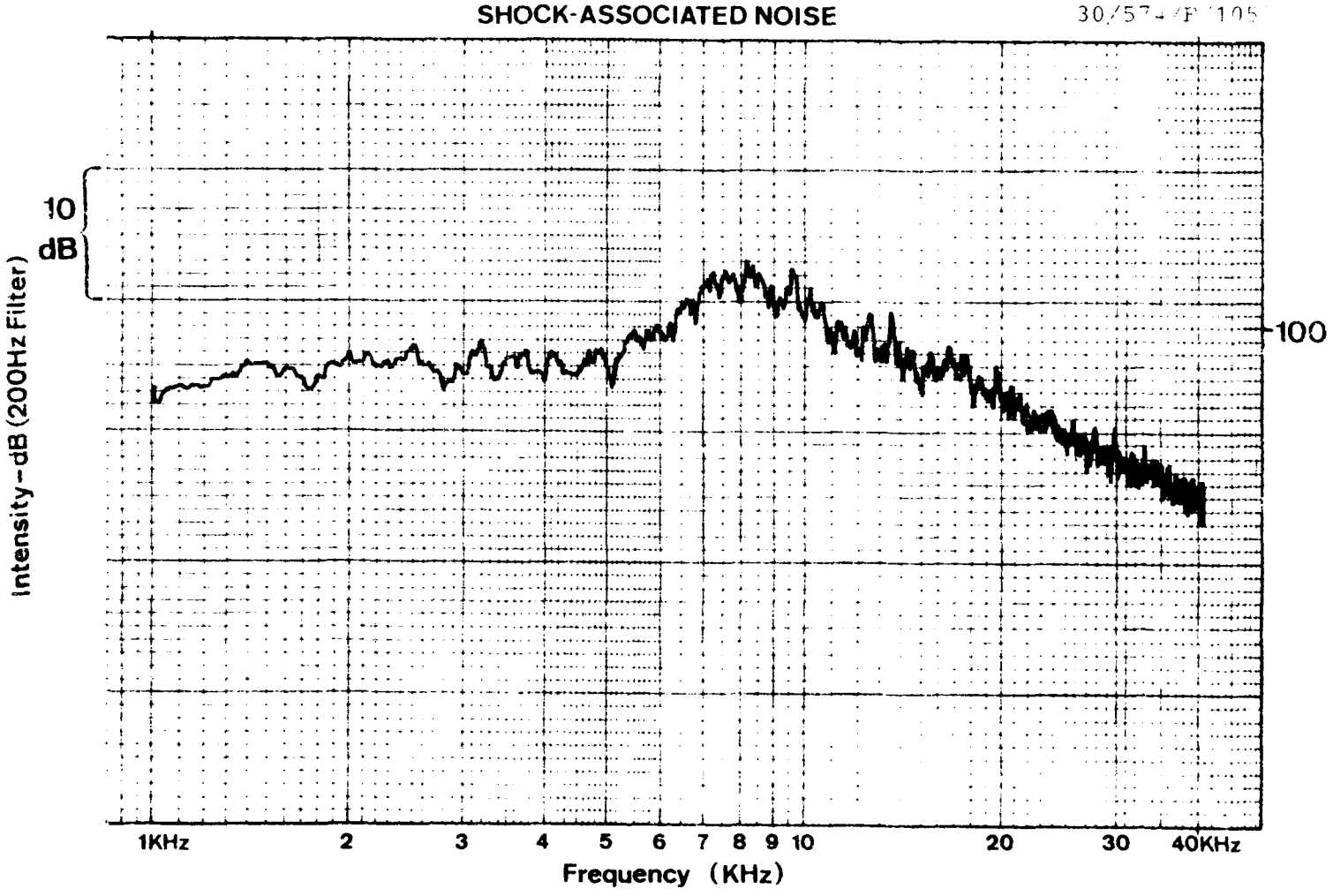
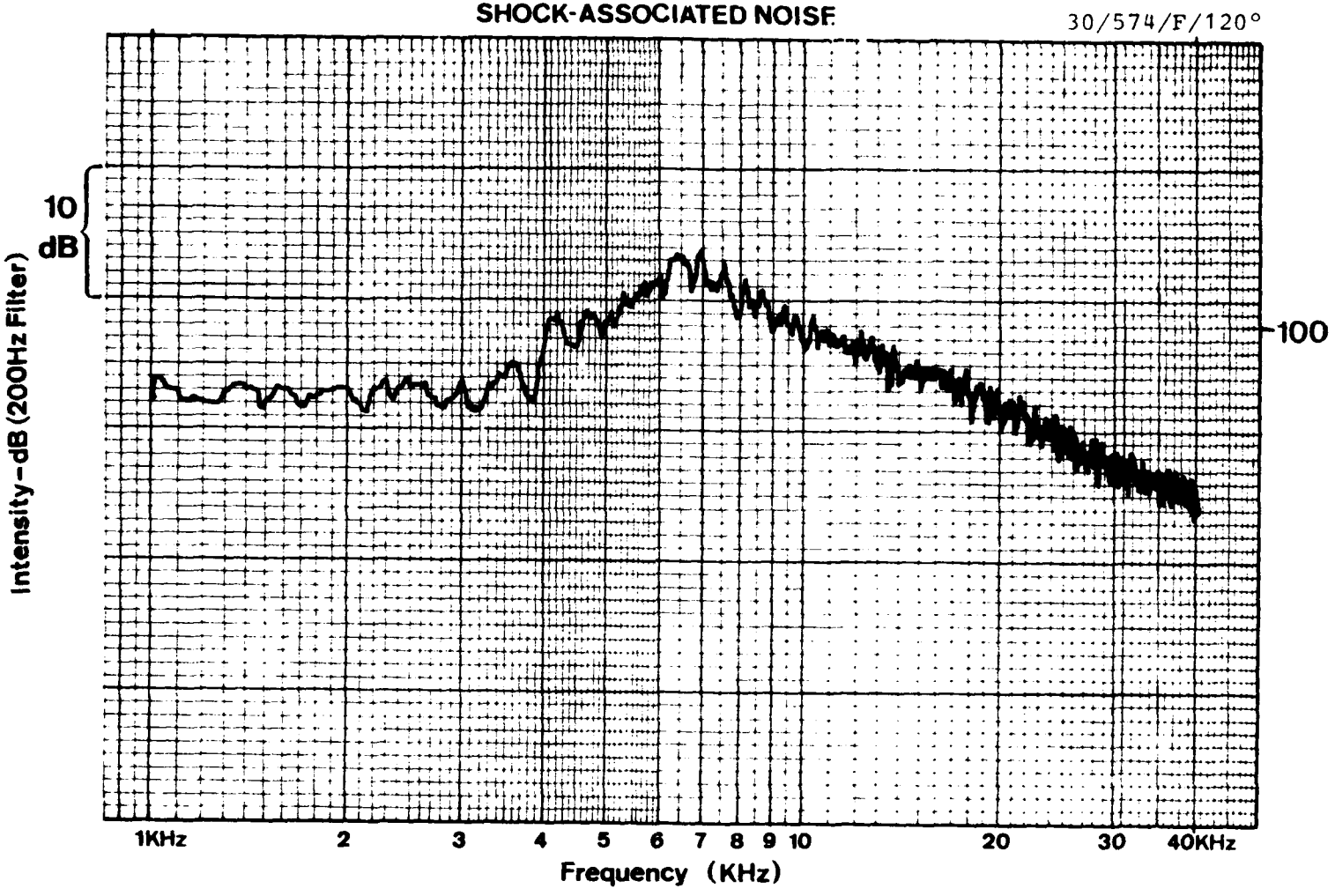
6
7
8
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
30/574/F/90°
10
dB
Intensity-dB (200Hz Filter)
100
1KHz
2
3
4
5
6
7
8
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
10
dB
Intensity - dB (200Hz Filter)
100
1KHz
2
3
4
5
6
7
8
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
30/574/F/120°
10 dB
Intensity - dB (200Hz Filter)
100
1KHz
2
3
4
5
6
7
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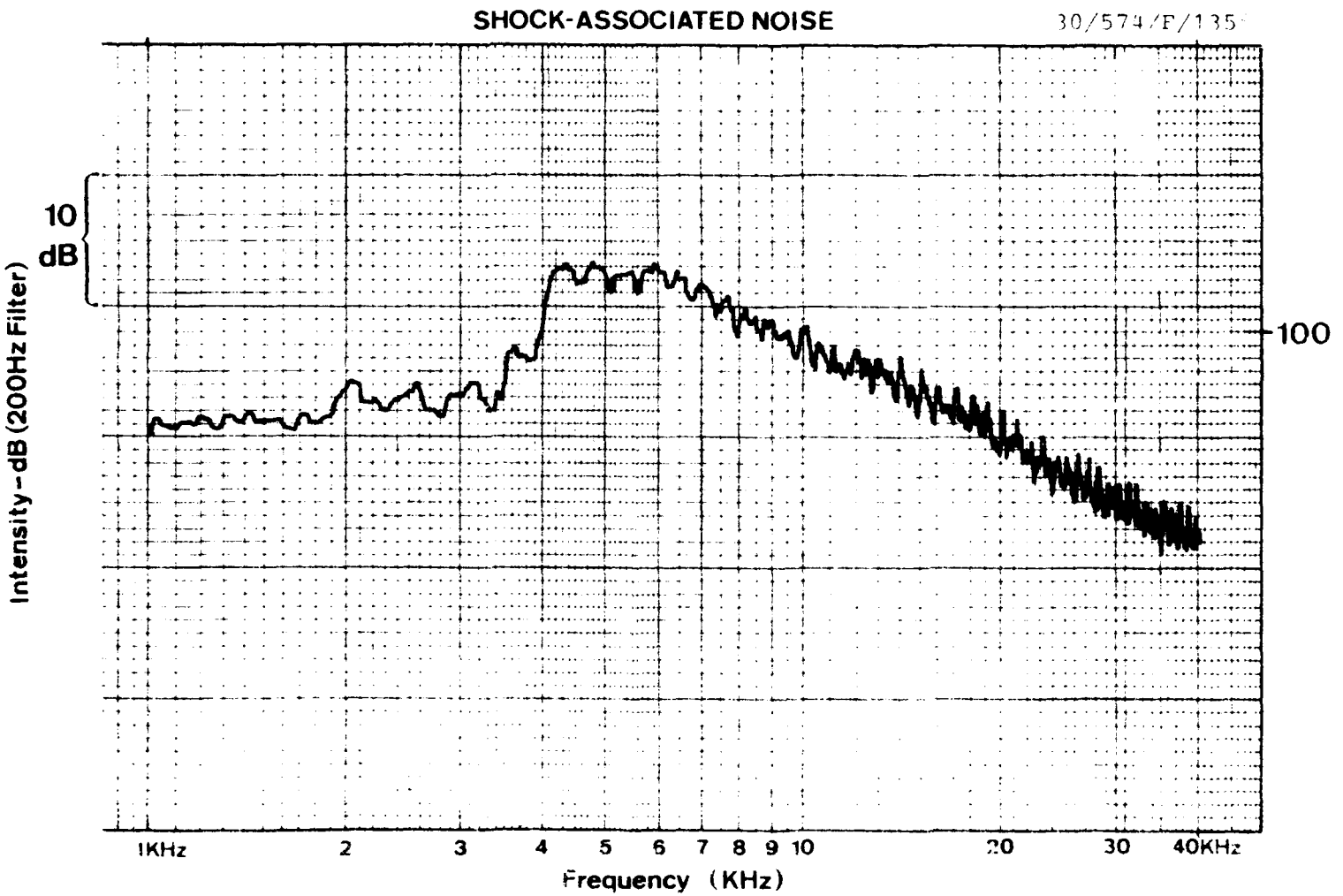
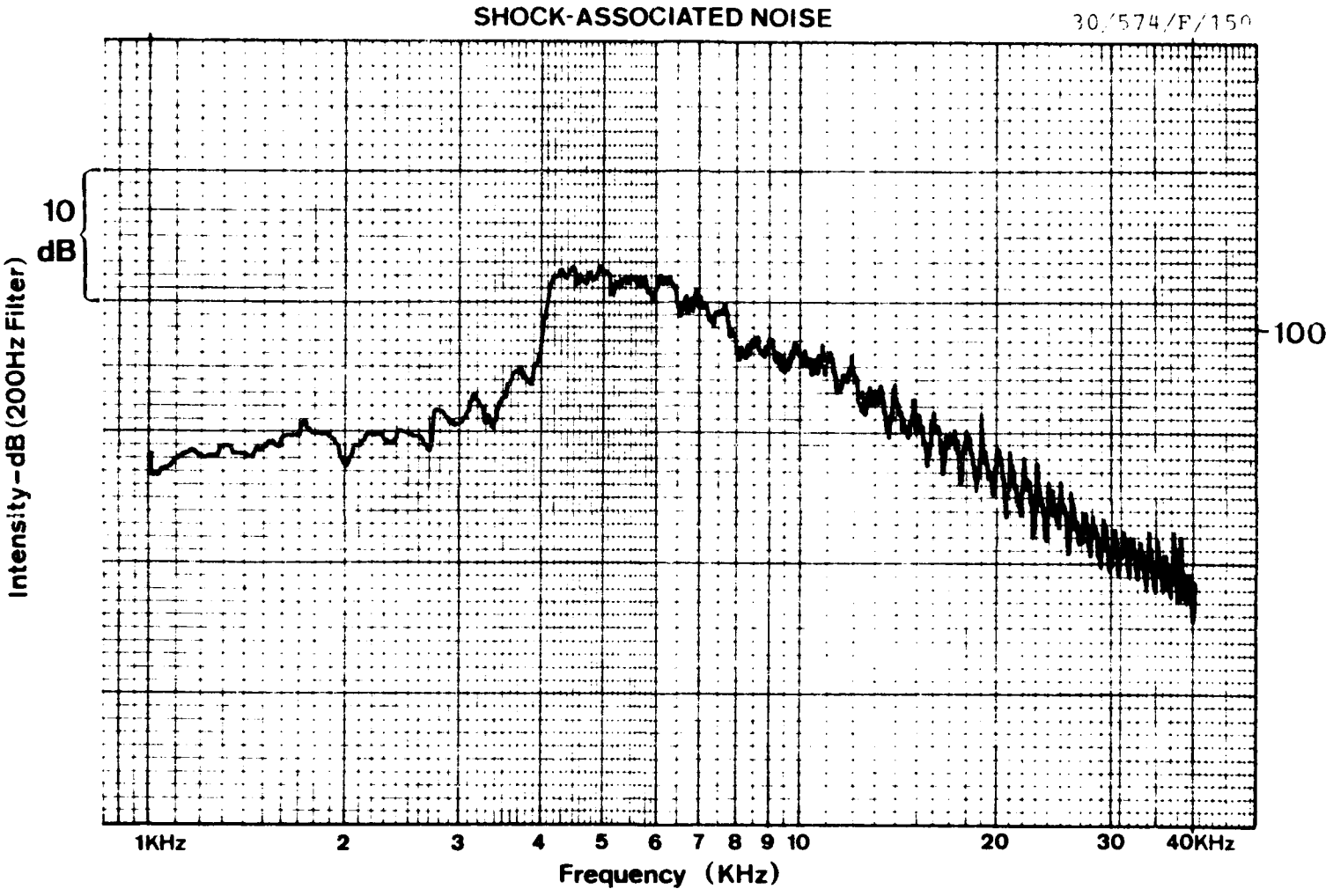
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
30/574/F/135
10
dB
Intensity - dB (200Hz Filter)
100
1KHz
2
3
4
5
6
7
8
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
30/574/F/150
10
dB
Intensity-dB (200Hz Filter)
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1KHz
2
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4
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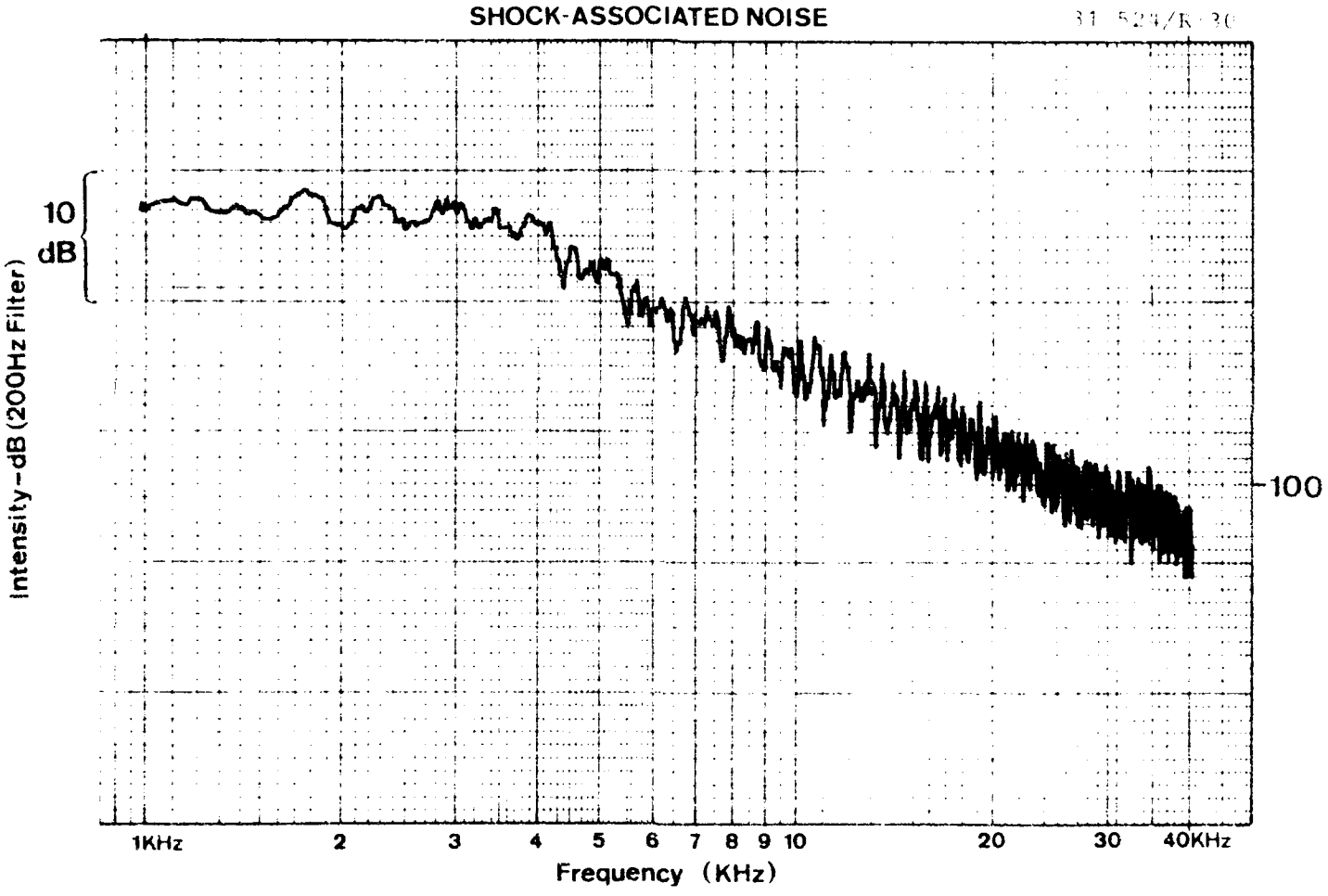
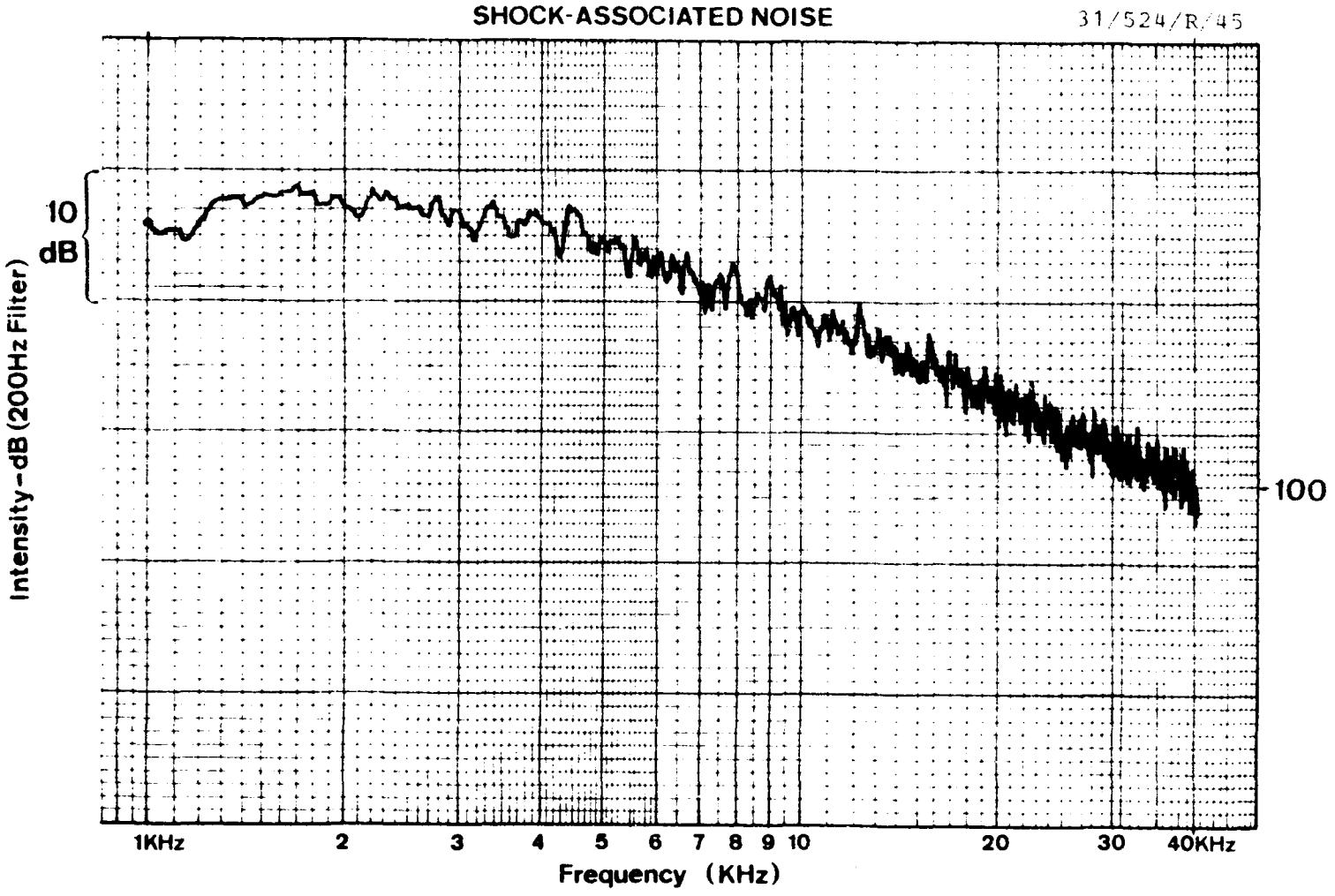
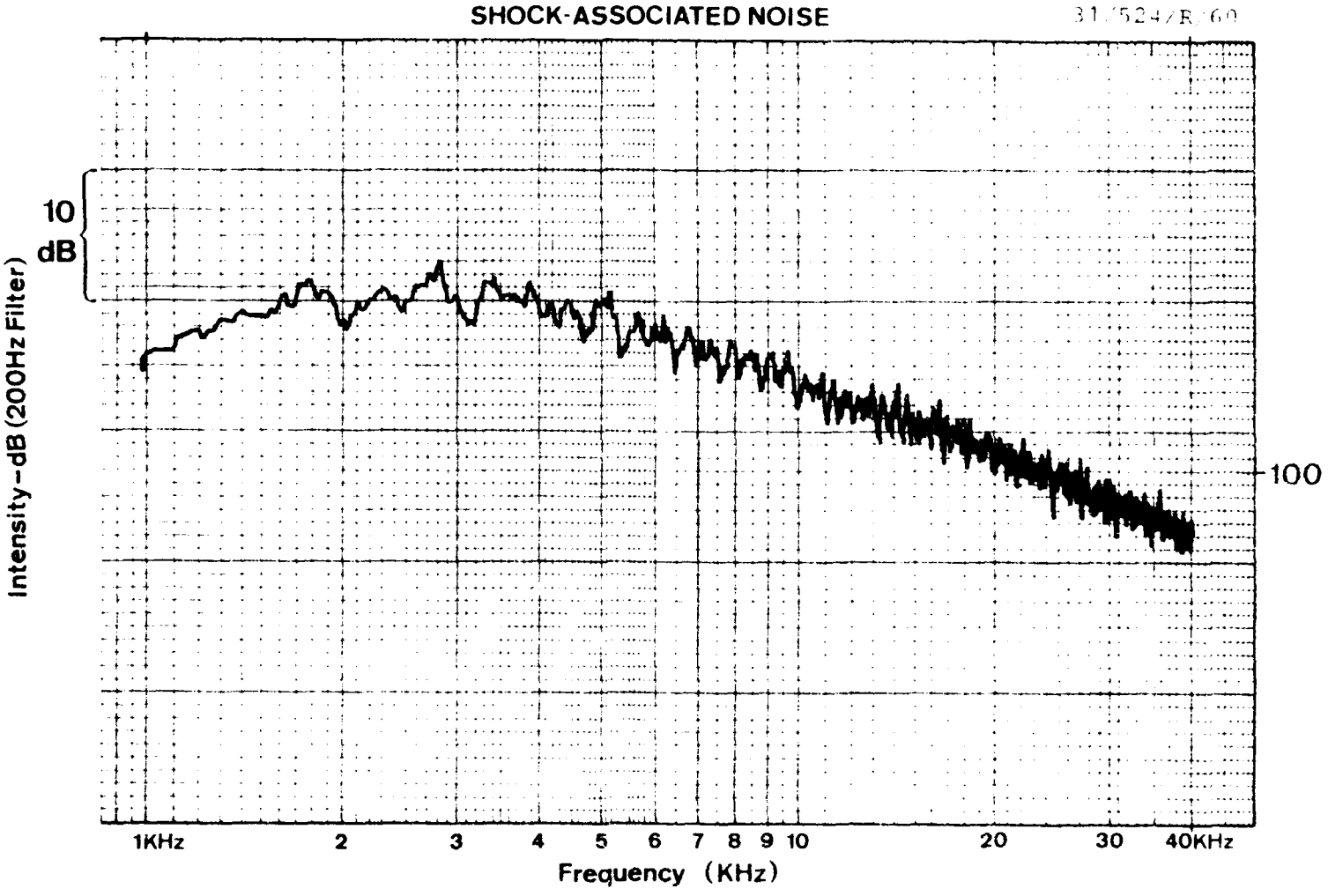
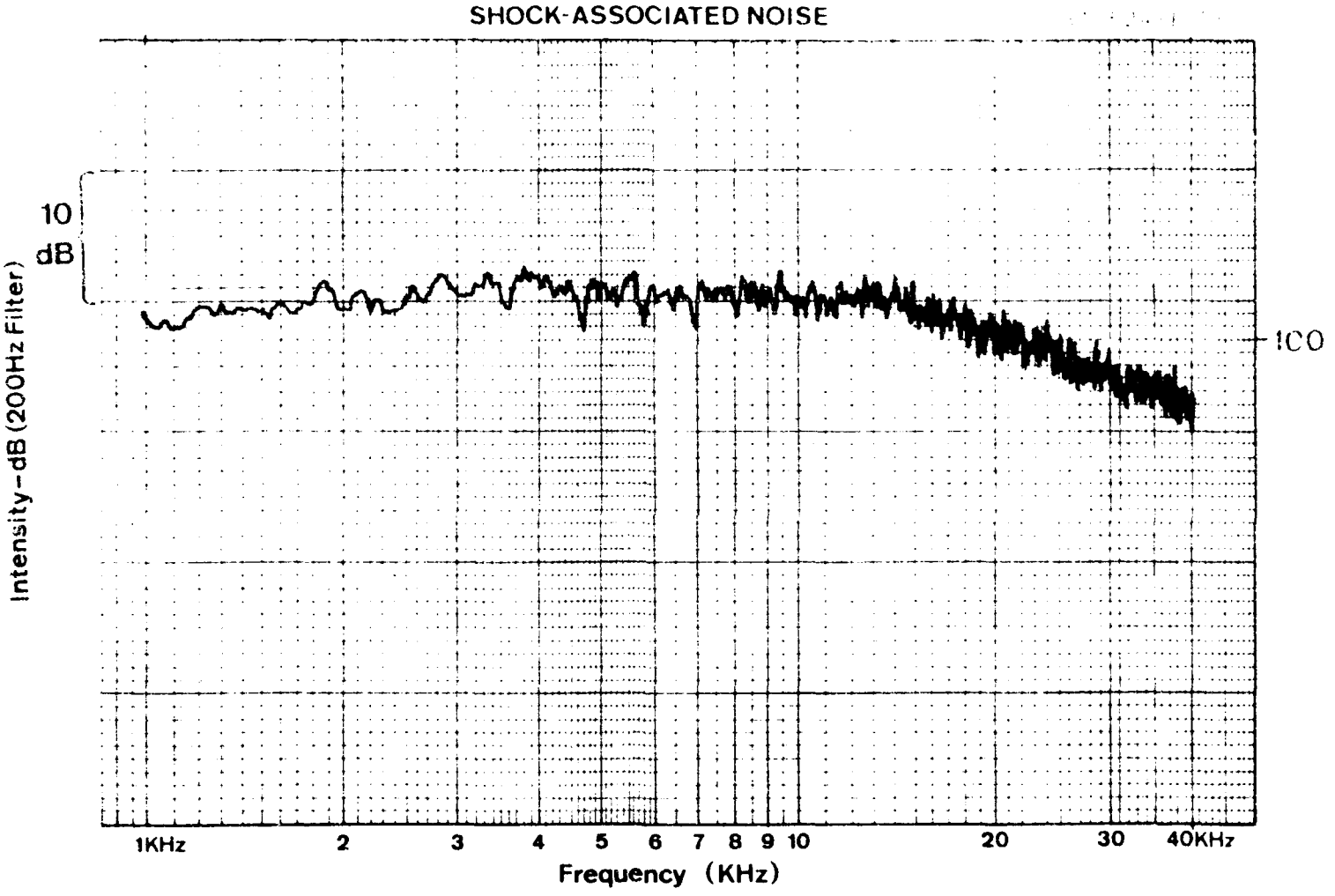
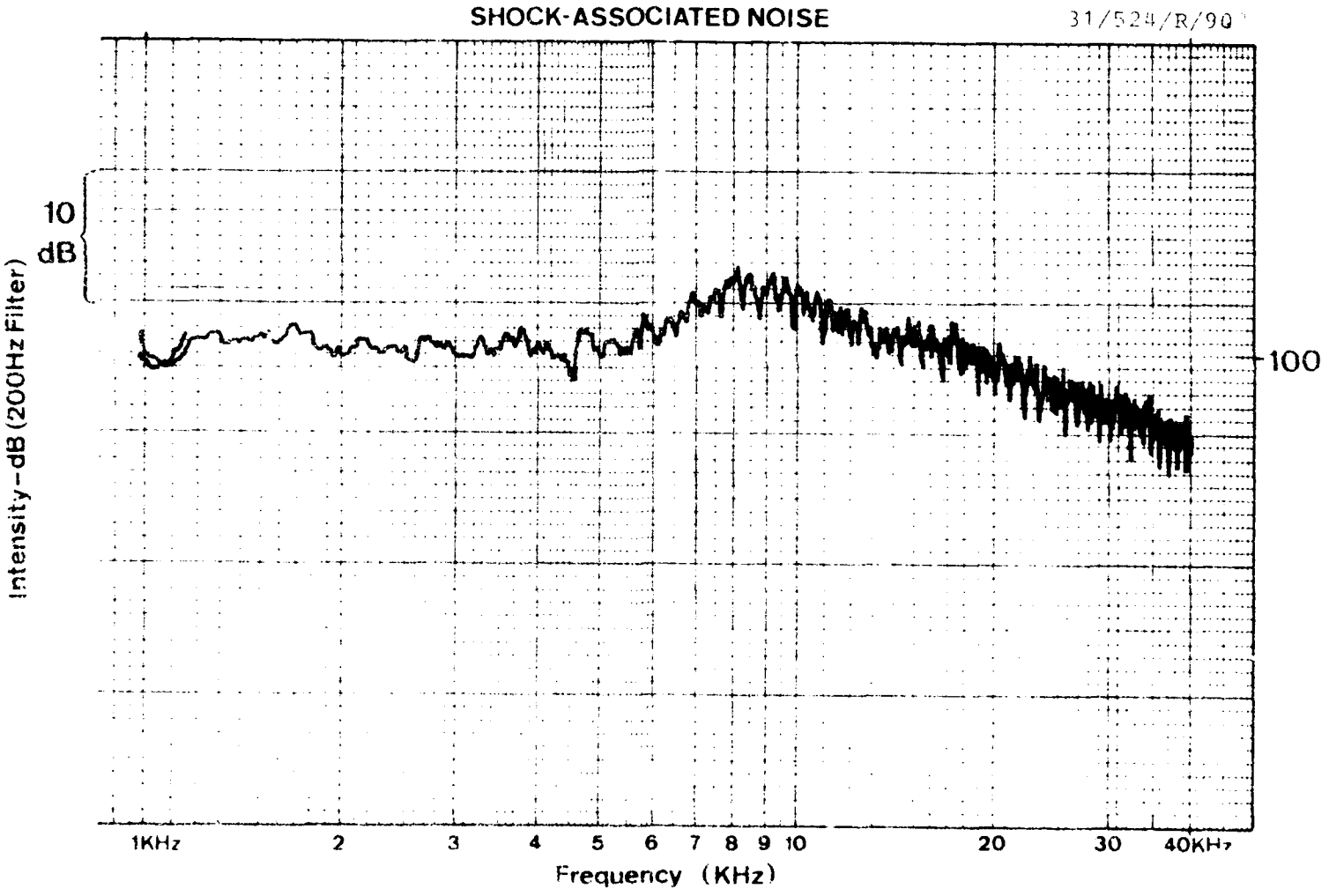
7
8
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
10
dB
Intensity-dB (200Hz Filter)
100
1KHz
2
3
4
5
6
7
8
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
31/524/R/45
10
dB
Intensity-dB (200Hz Filter)
100
1KHz
2
3
4
5
6
7
8
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
10
dB
Intensity-dB (200Hz Filter)
100
1KHz
2
3
4
5
6
7
8
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
10
dB
Intensity - dB (200Hz Filter)
100
1KHz
2
3
4
5
6
7
8
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
31/524/R/90
10
dB
Intensity - dB (200Hz Filter)
100
1KHz
2
3
4
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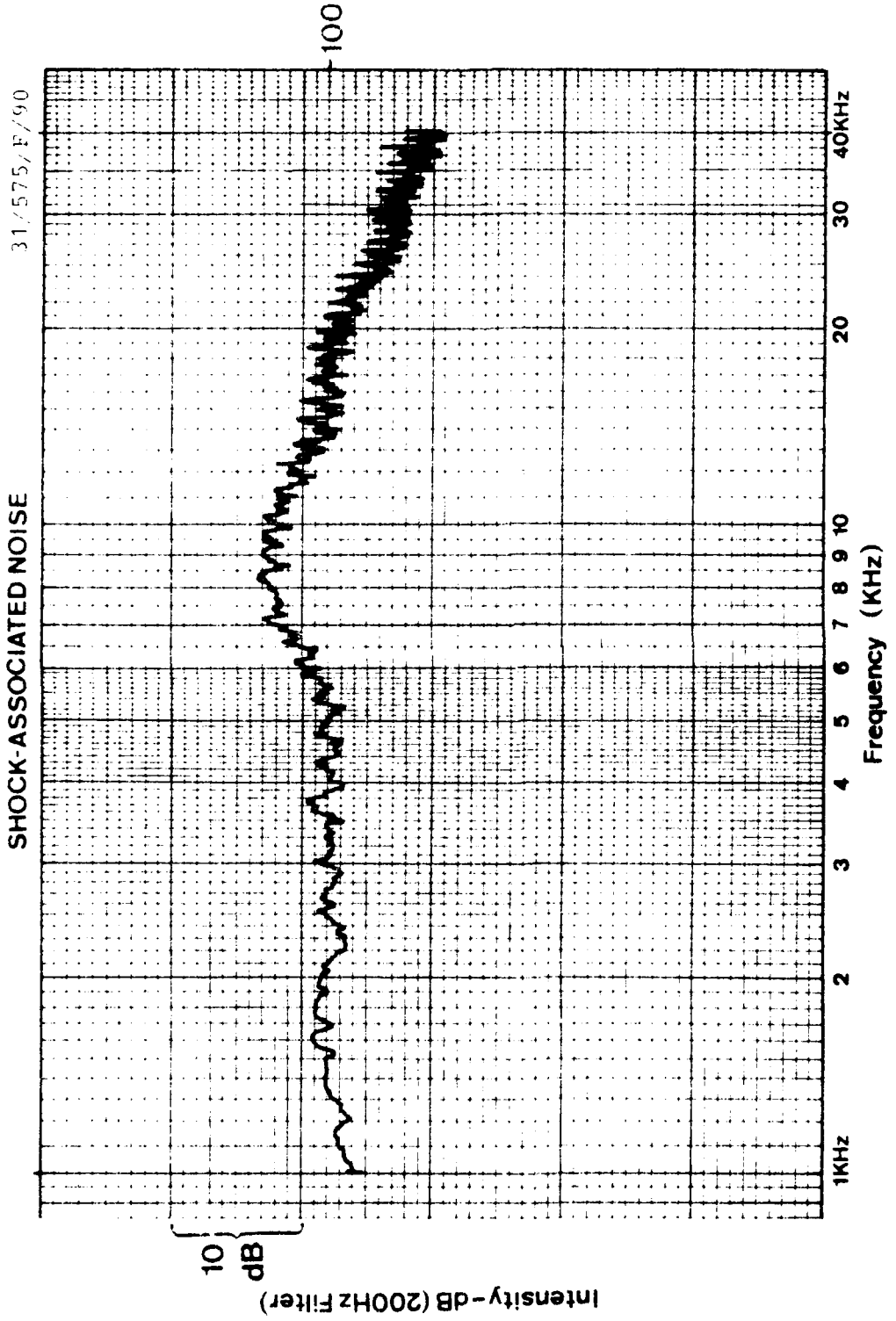
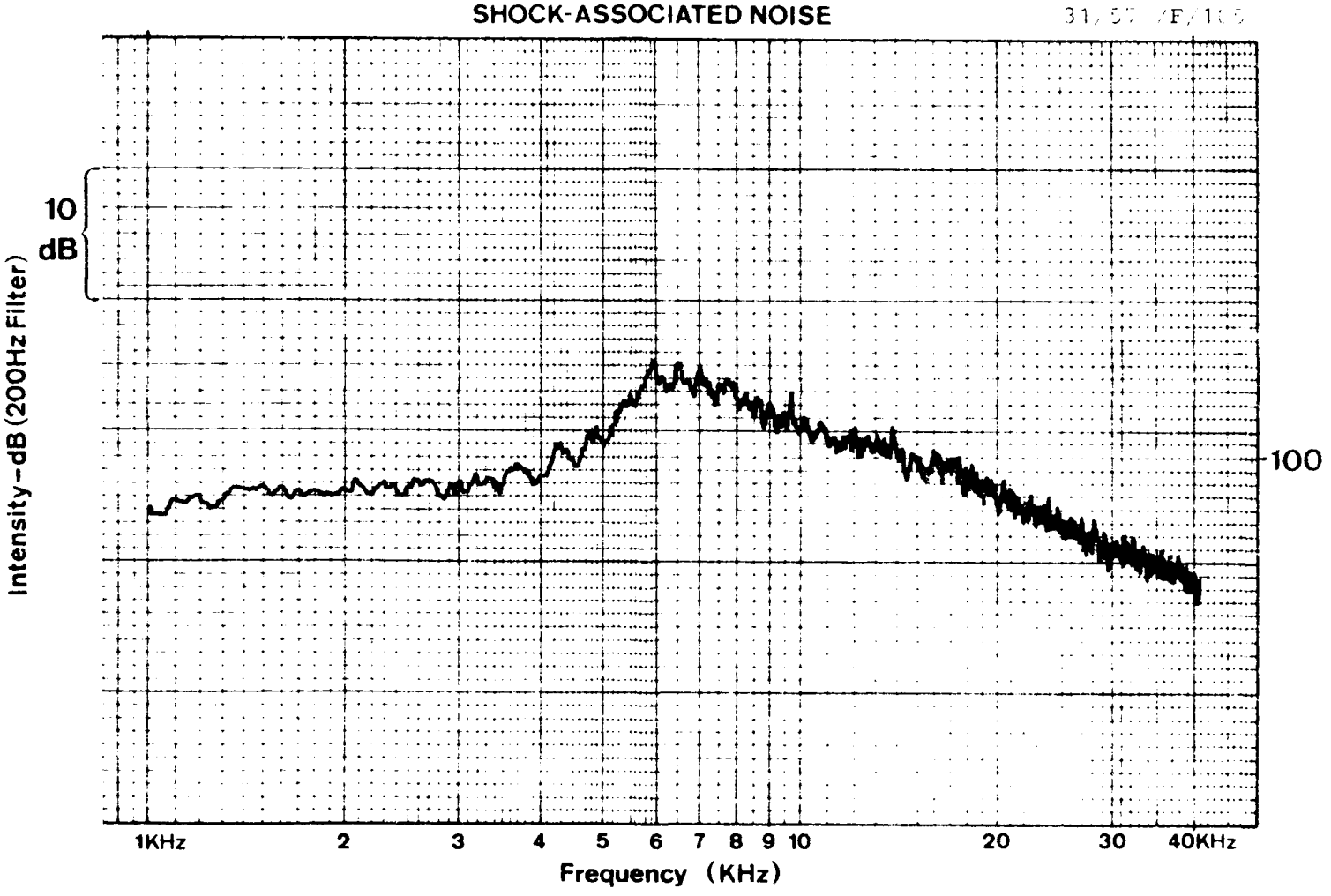
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
31/575/F/90
100
10 dB
Intensity – dB (200Hz Filter)
1KHz
2
3
4
5
6
7
8
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
10
dB
Intensity - dB (200Hz Filter)
100
1KHz
2
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4
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6
7
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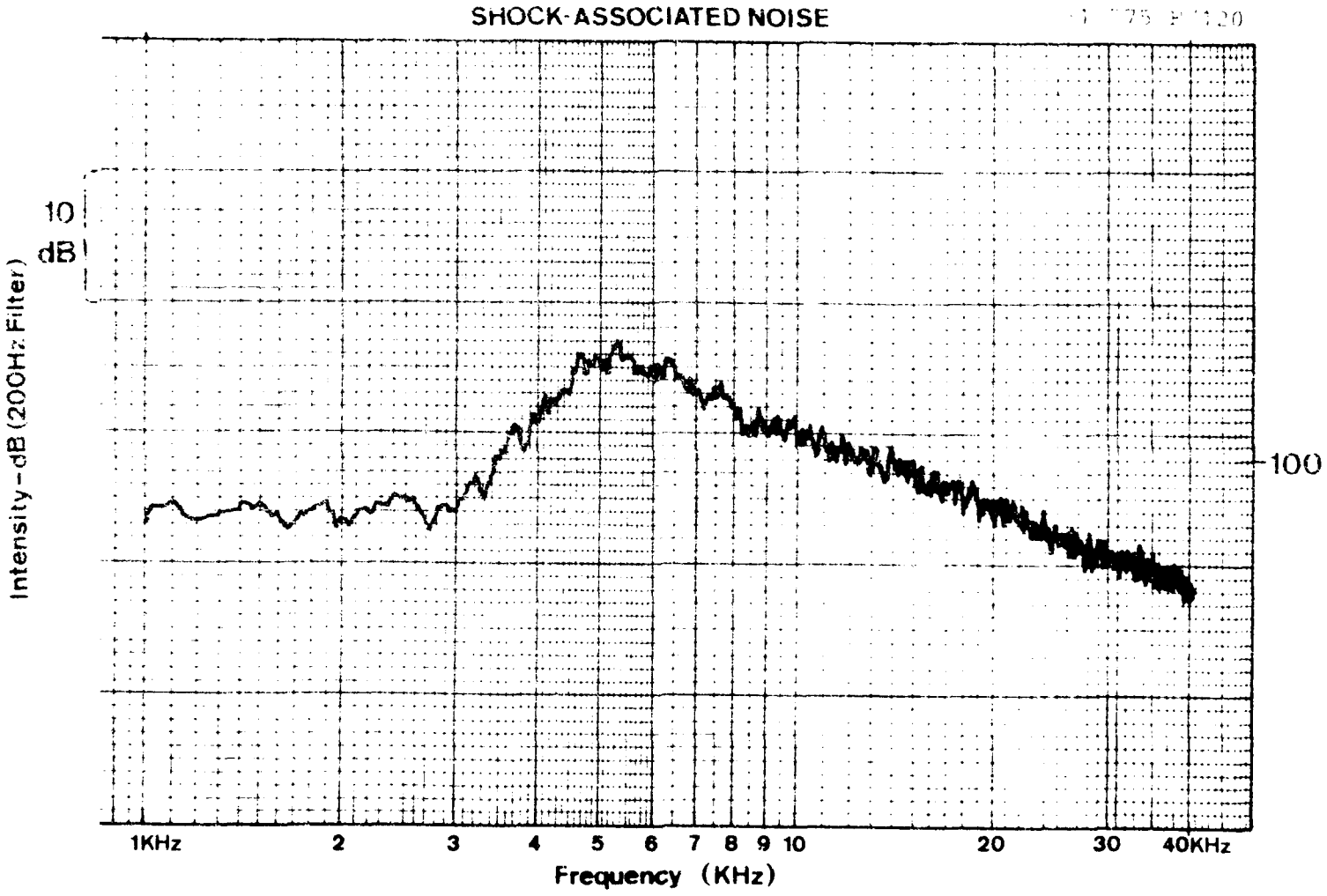
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
10
dB
Intensity - dB (200Hz Filter)
100
1KHz
2
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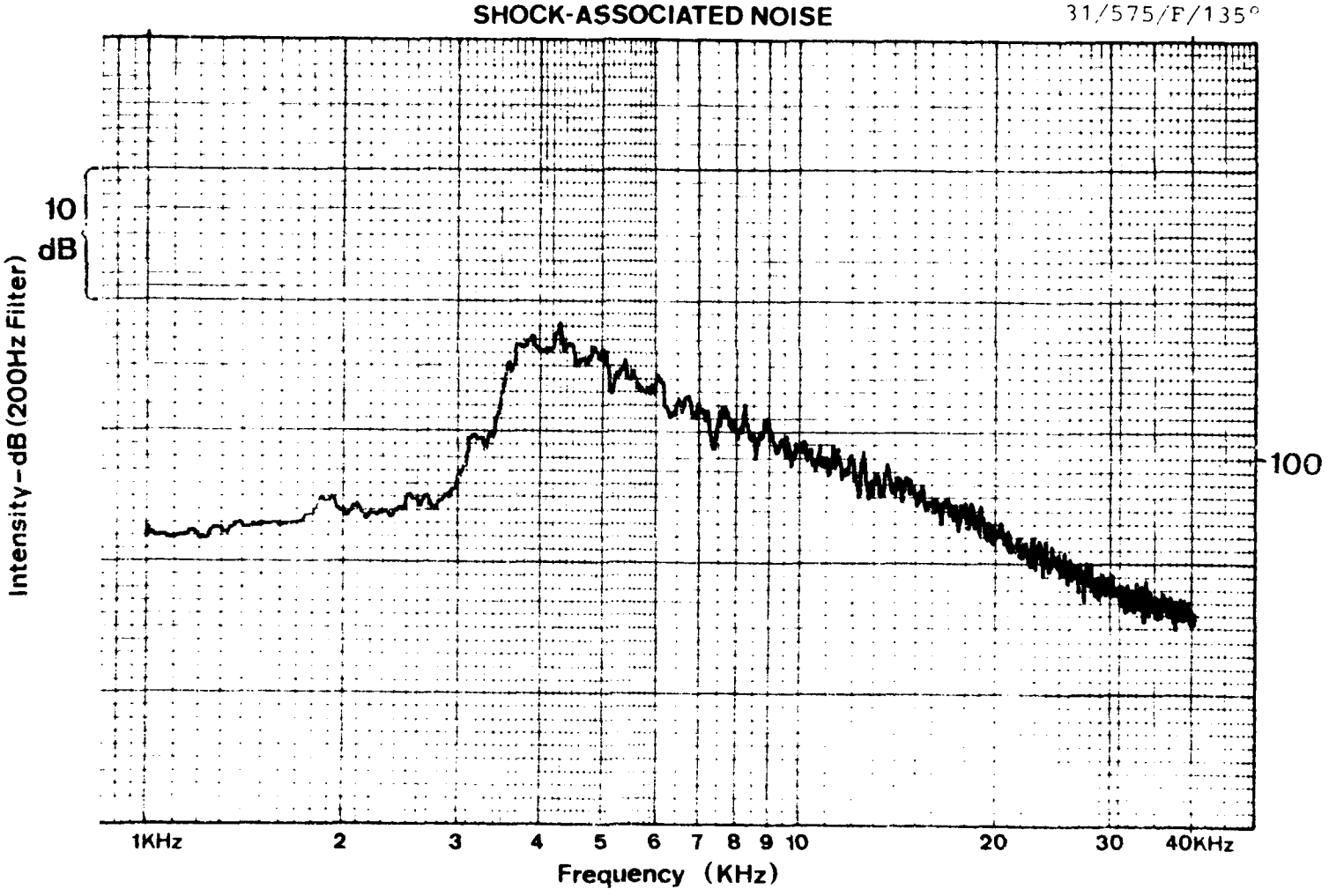
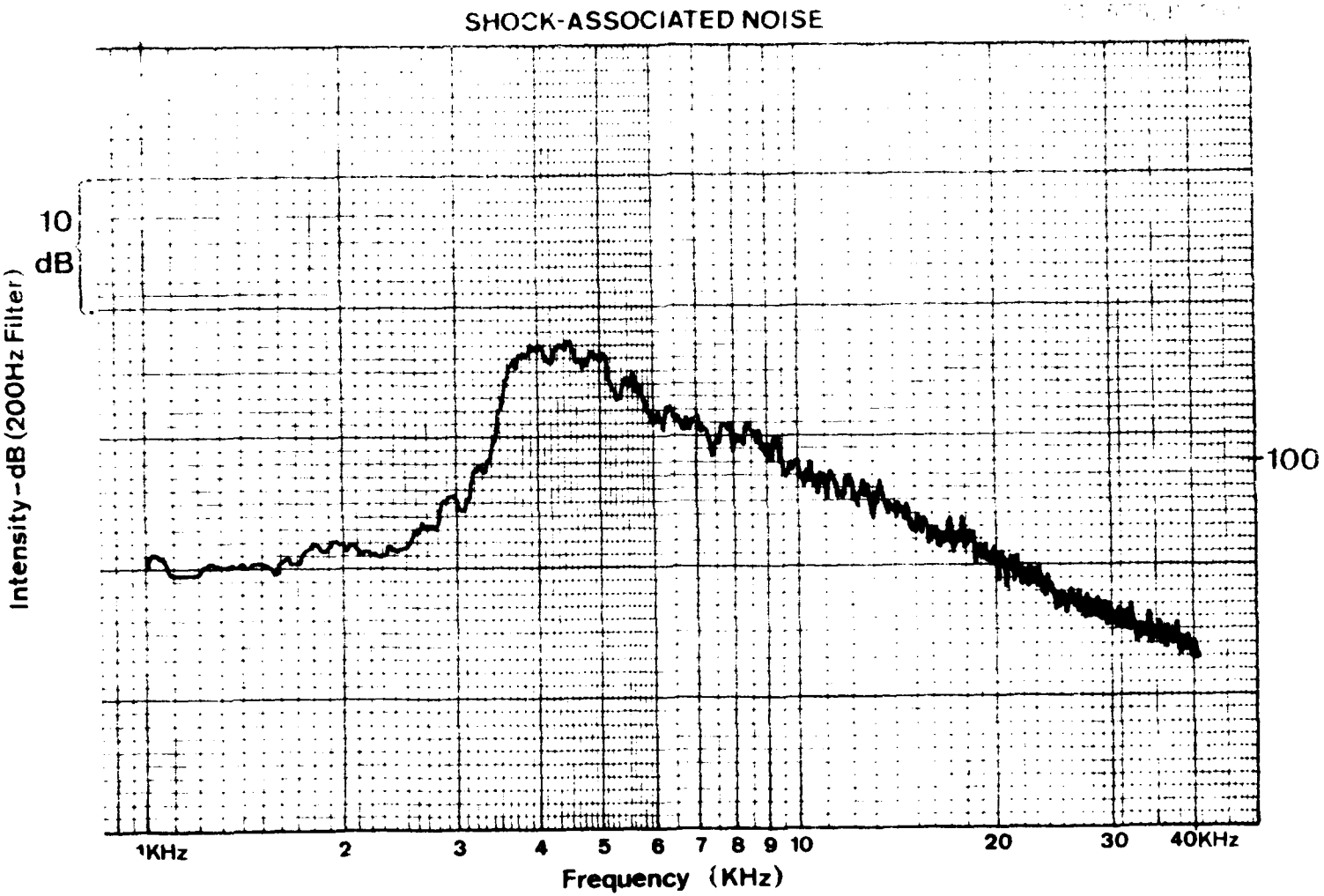
4
5
6
7
8
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
31/575/F/135°
10
dB
Intensity-dB (200Hz Filter)
100
1KHz
2
3
4
5
6
7
8
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
10
dB
Intensity - dB (200Hz Filter)
100
1KHz
2
3
4
5
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7
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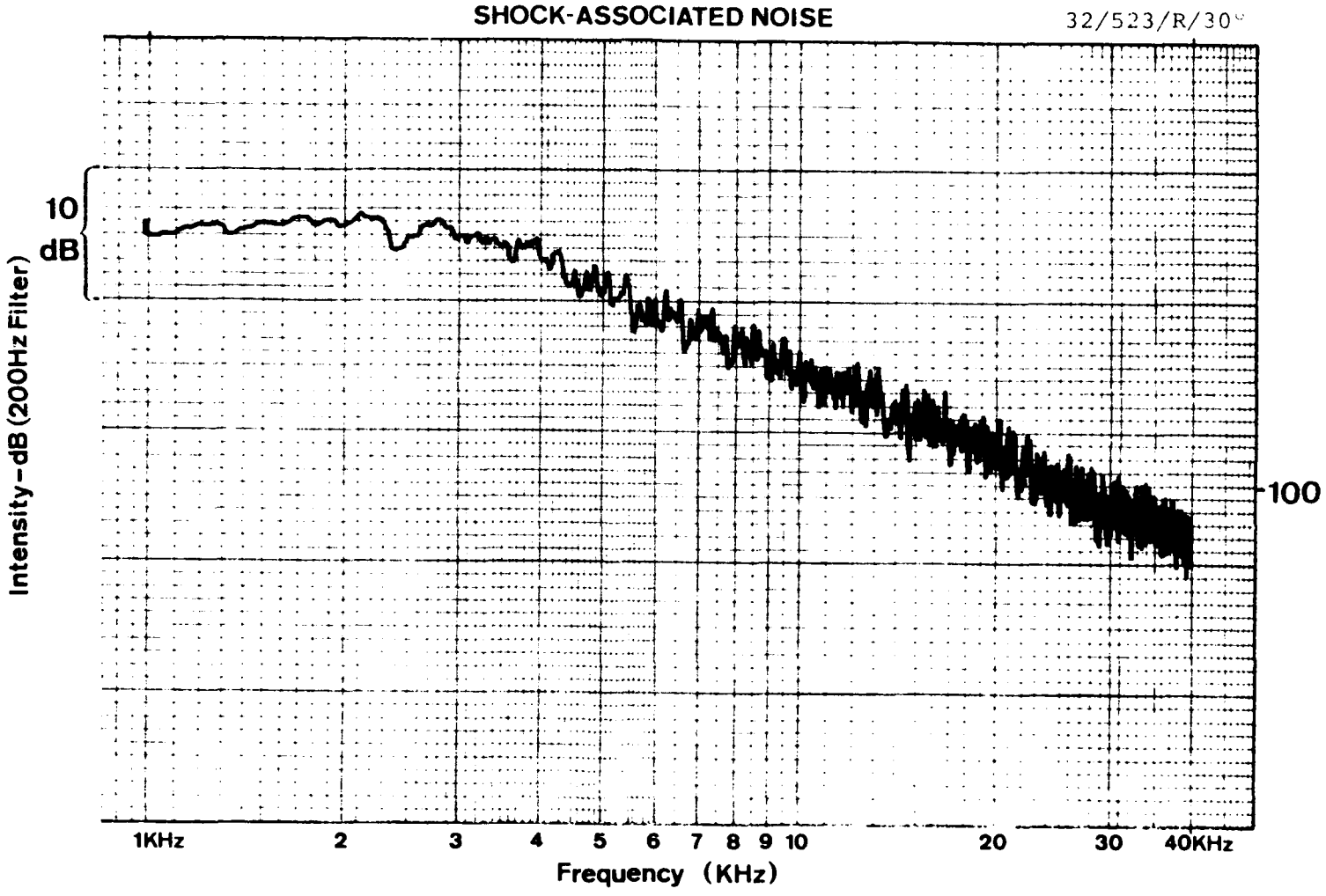
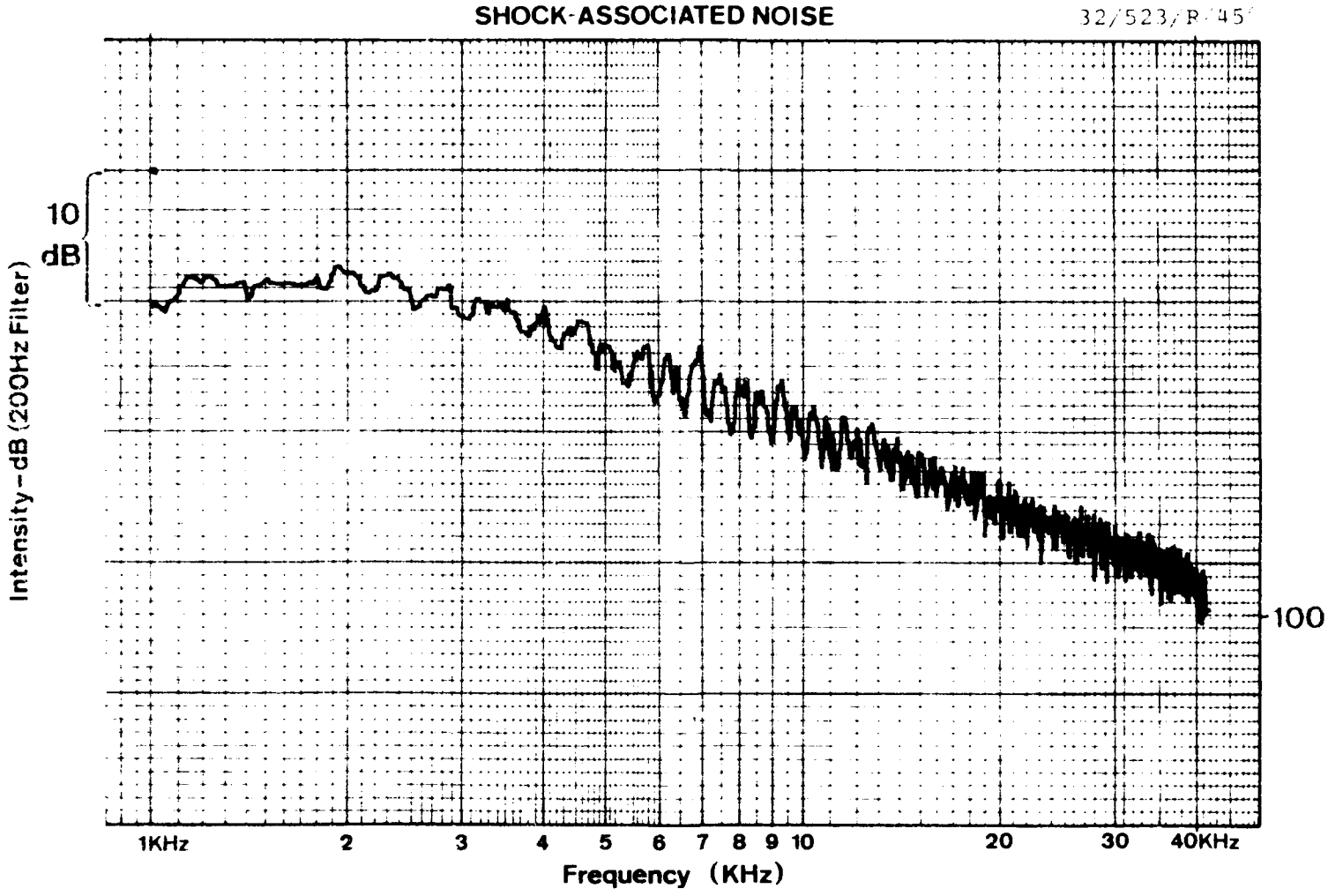
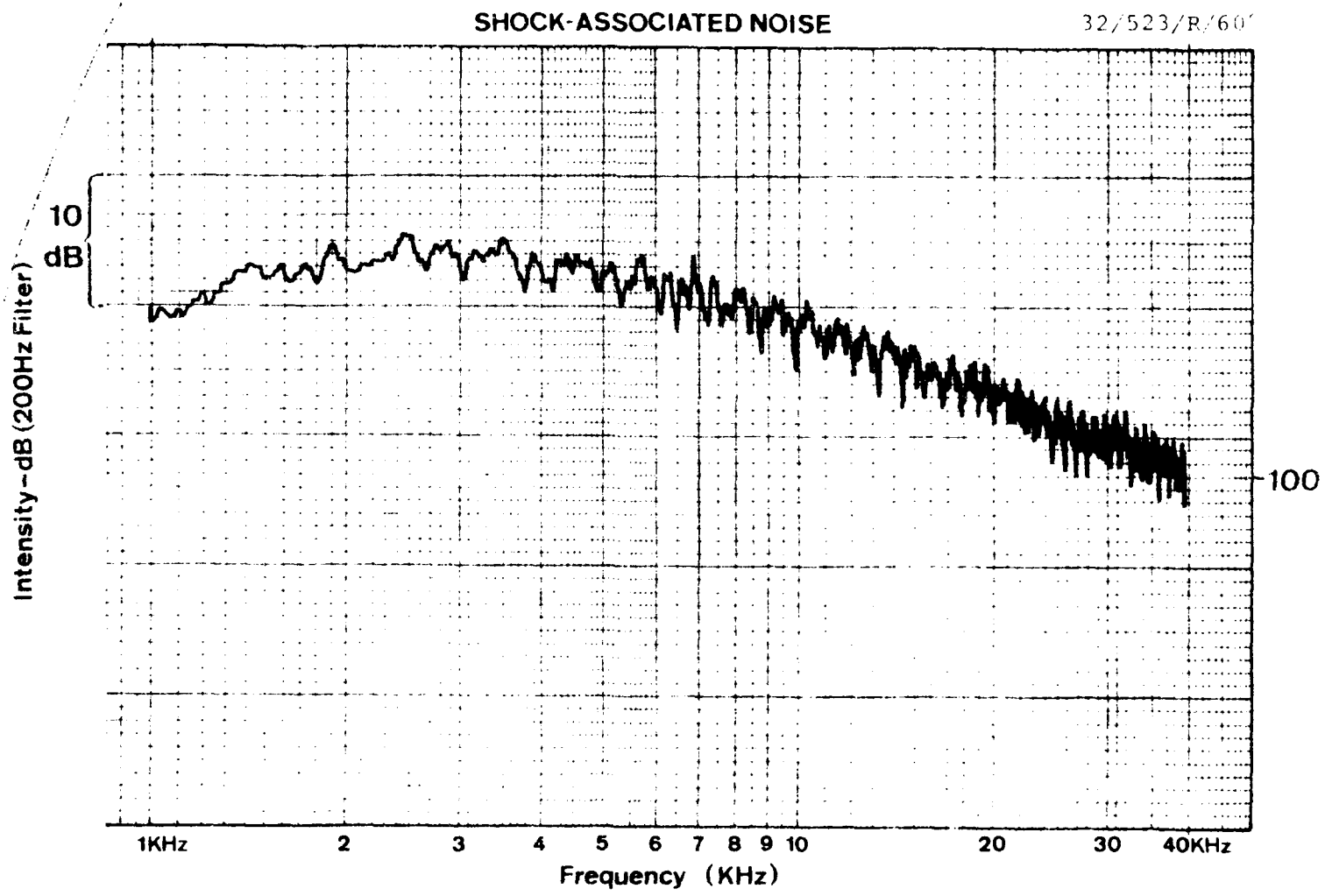
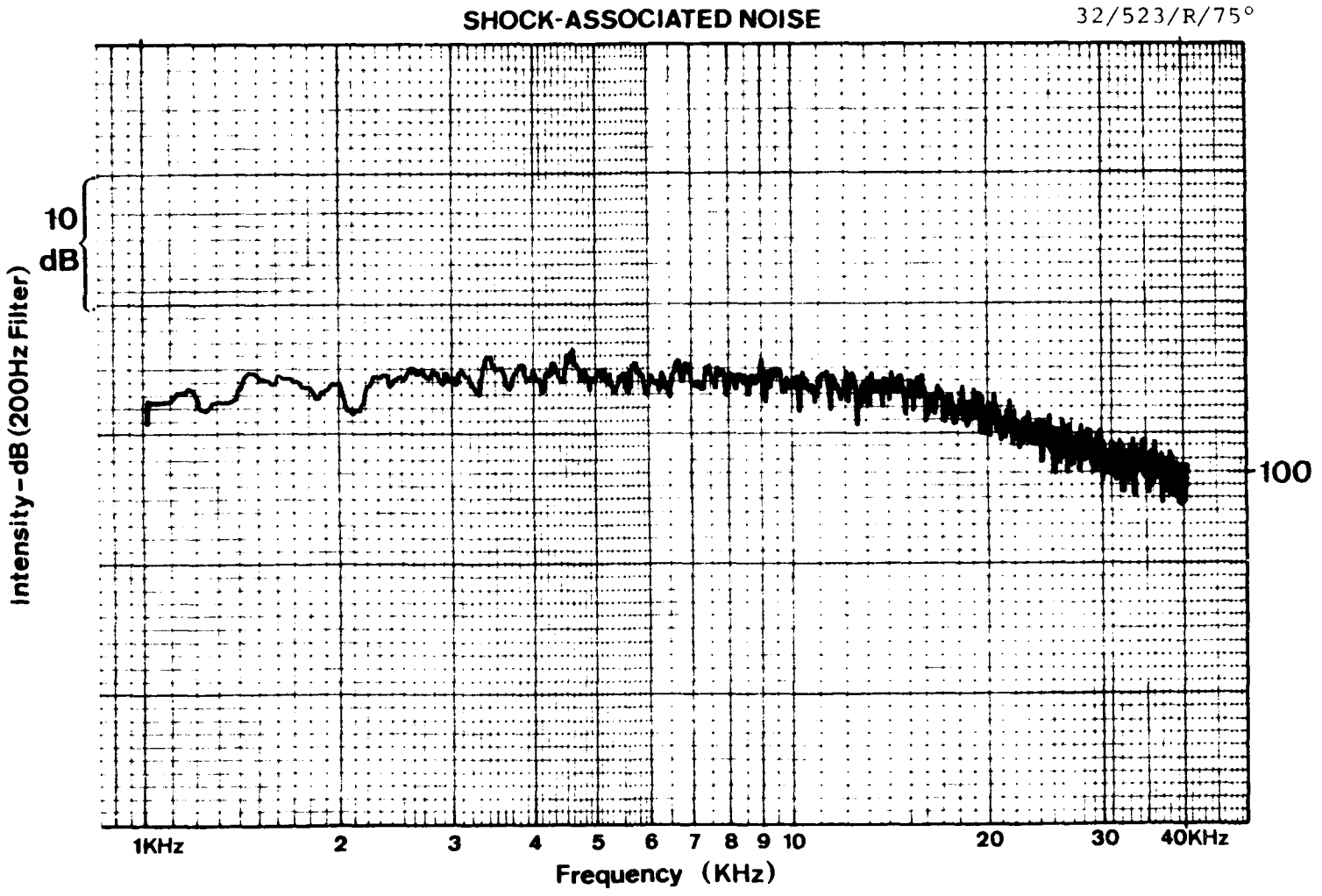
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
32/523/R/30
10
dB
Intensity - dB (200Hz Filter)
100
1KHz
2
3
4
5
6
7
8
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
32/523/R/45
10
dB
Intensity - dB (200Hz Filter)
100
1KHz
2
3
4
5
6
7
8
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
32/523/R/60
10
dB
Intensity-dB (200Hz Filter)
100
1KHz
2
3
4
5
6
7
8
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
32/523/R/75°
10
dB
Intensity - dB (200Hz Filter)
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1KHz
2
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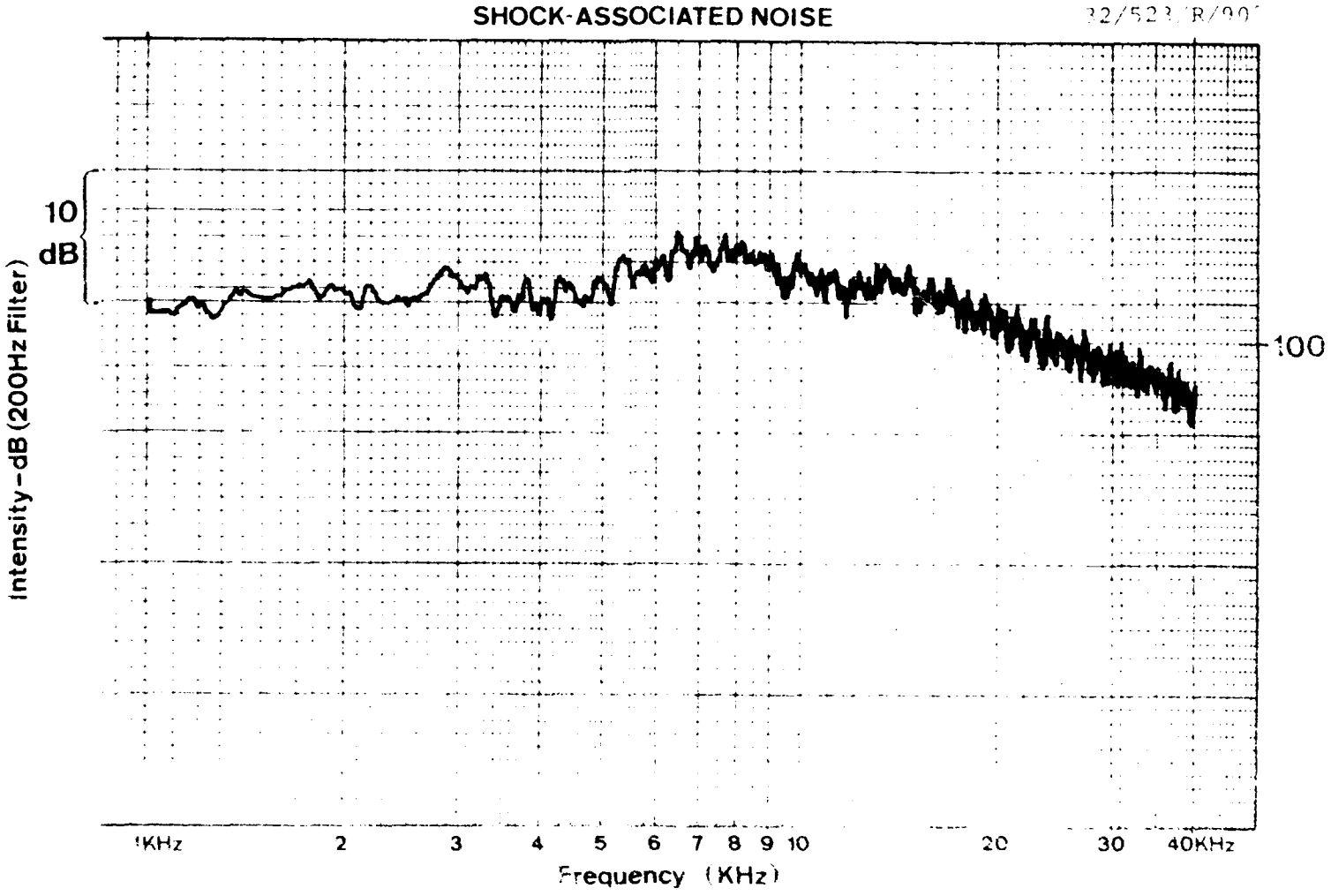
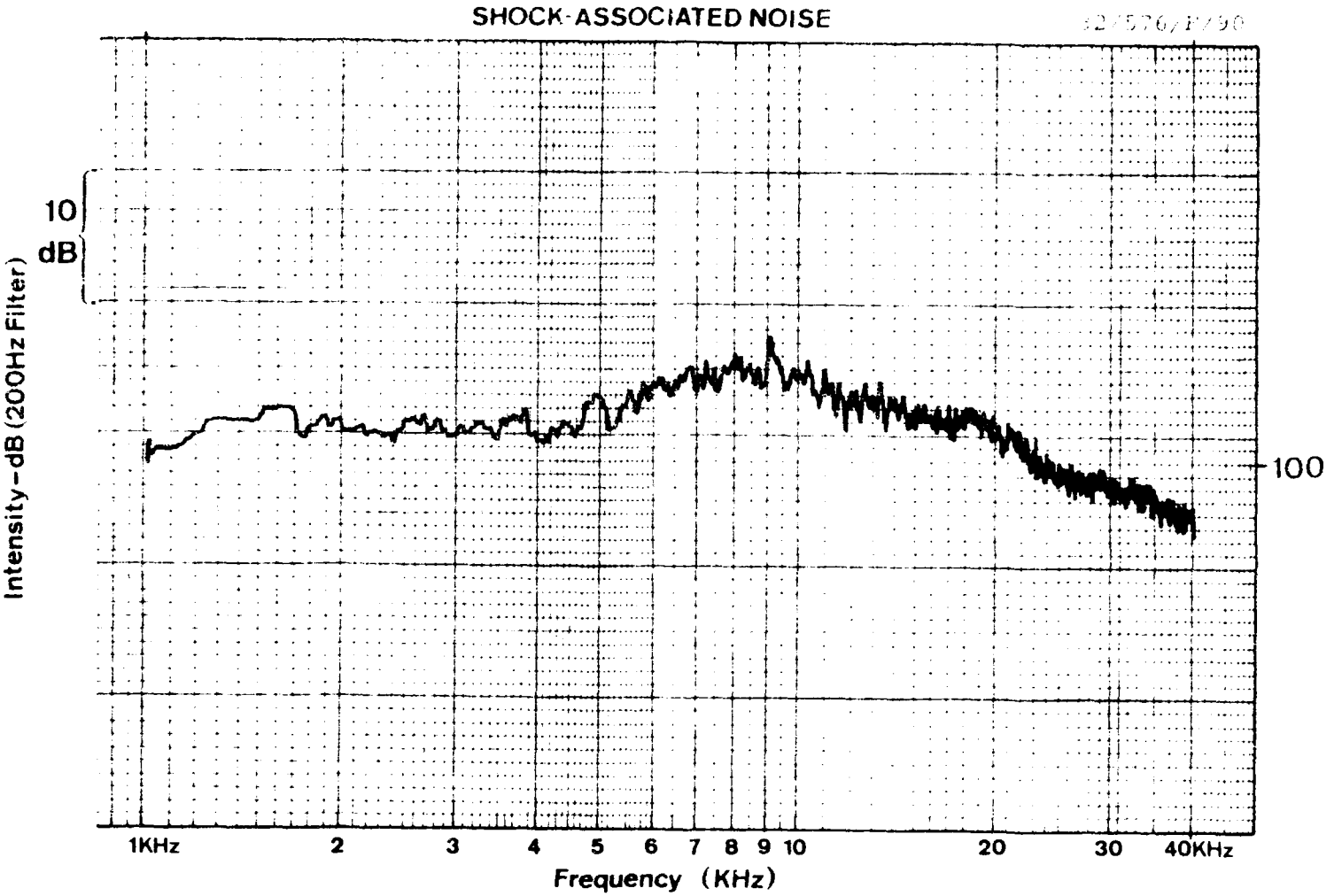
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
10
dB
Intensity - dB (200Hz Filter)
100
1KHz
2
3
4
5
6
7
8
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
10
dB
Intensity-dB (200Hz Filter)
100
1KHz
2
3
4
5
6
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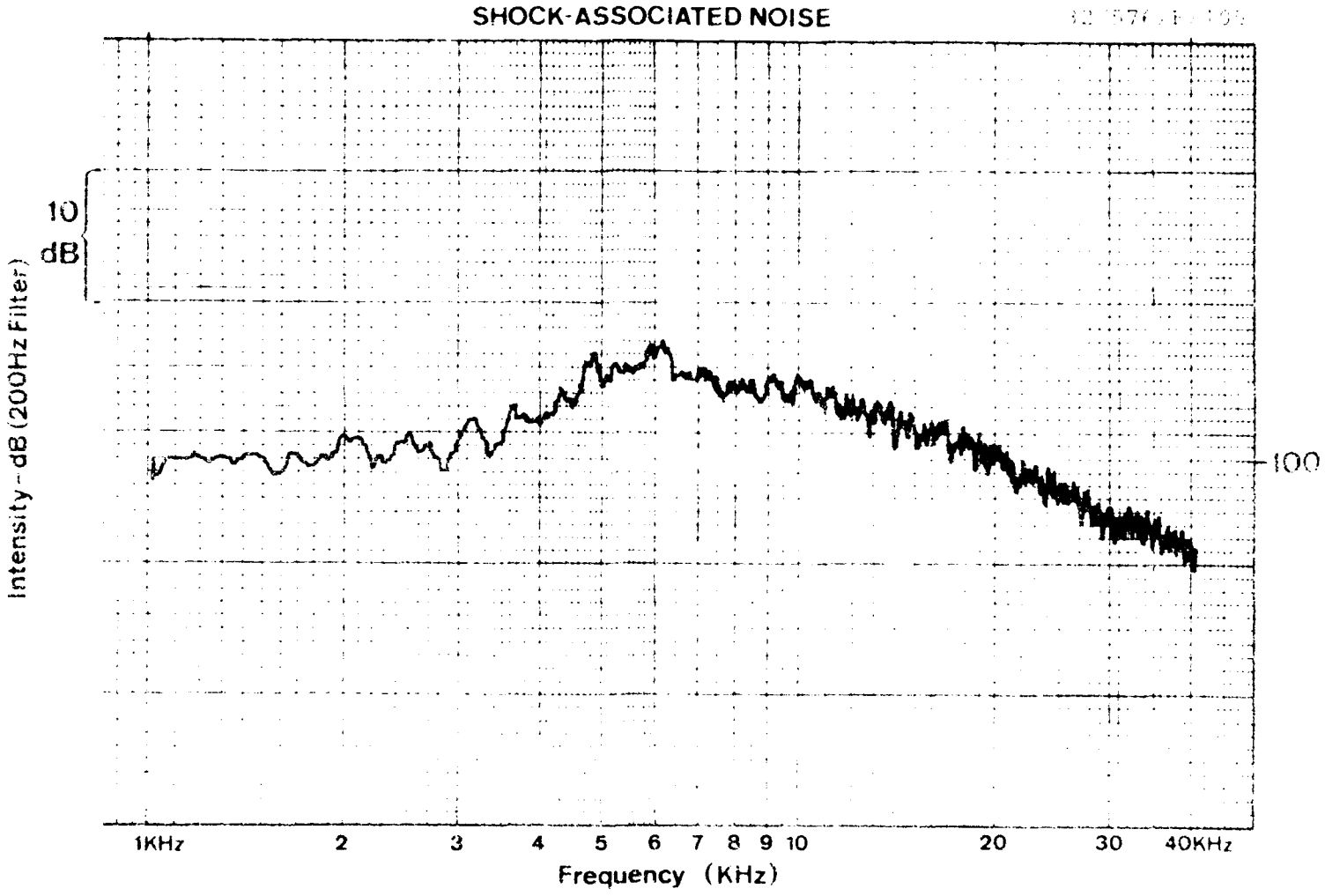
8
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
10
dB
Intensity - dB (200Hz Filter)
100
1KHz
2
3
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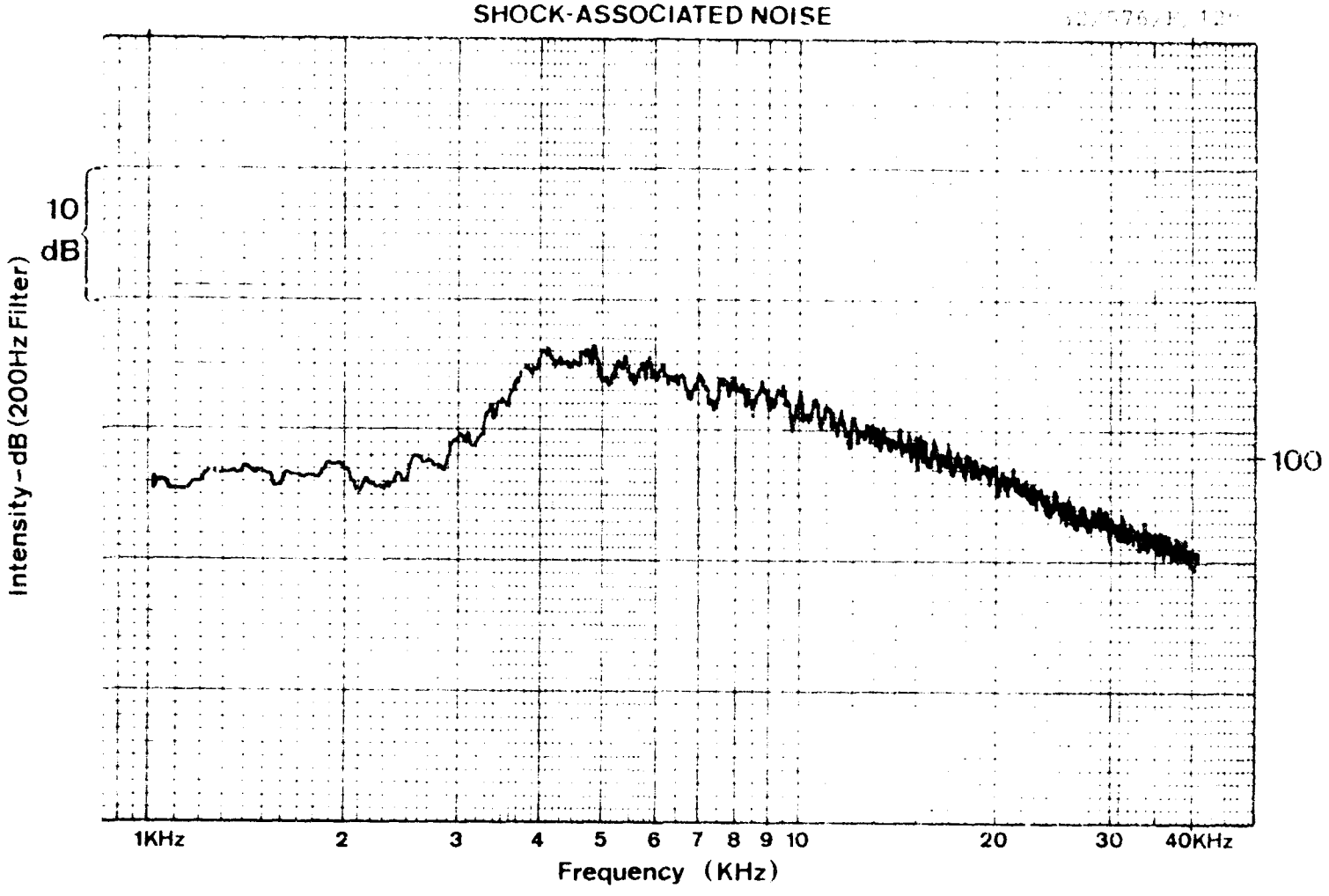
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
10
dB
Intensity - dB (200Hz Filter)
100
1KHz
2
3
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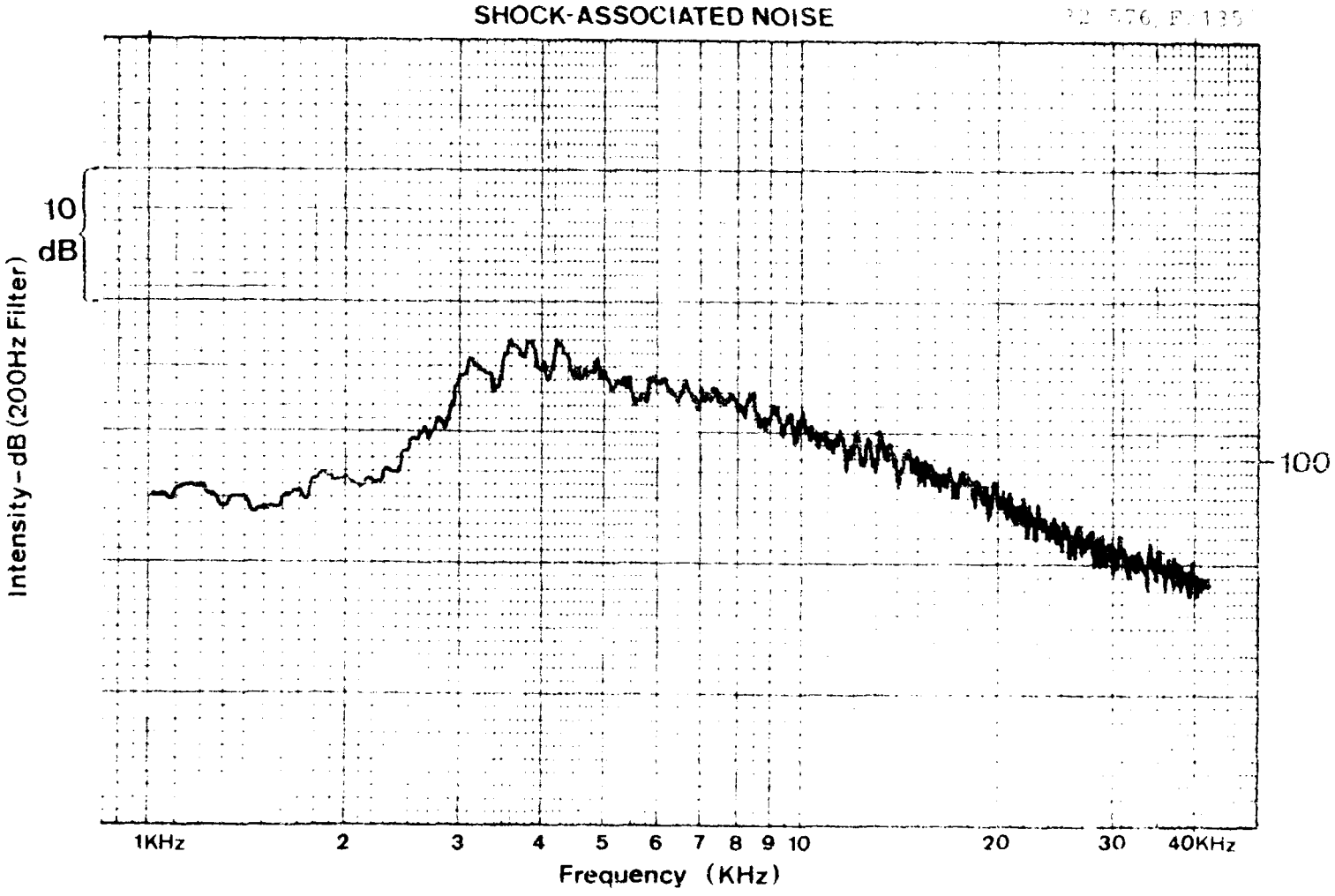
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
10
dB
Intensity - dB (200Hz Filter)
100
1KHz
2
3
4
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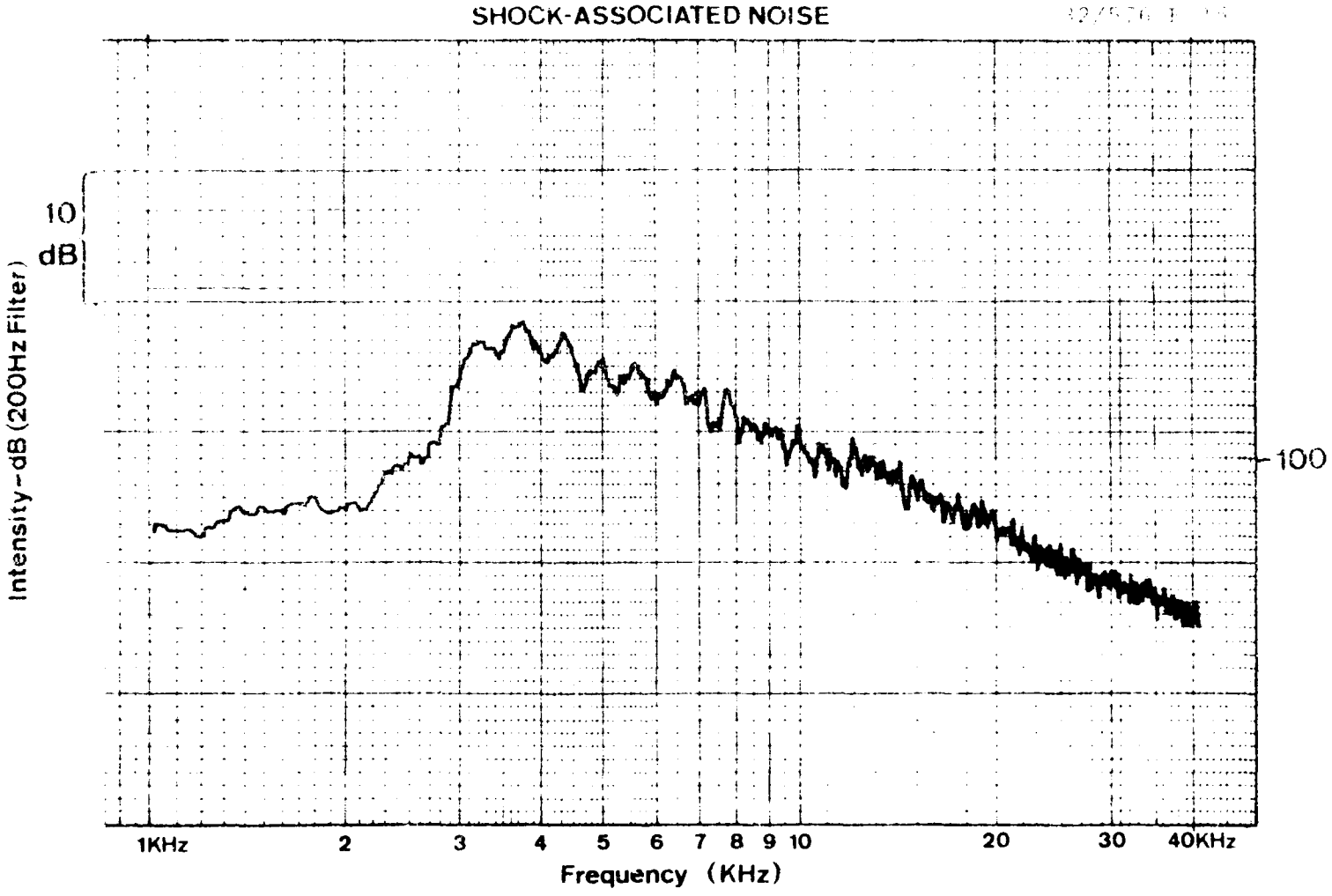
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
10
dB
Intensity-dB (200Hz Filter)
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1KHz
2
3
4
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9
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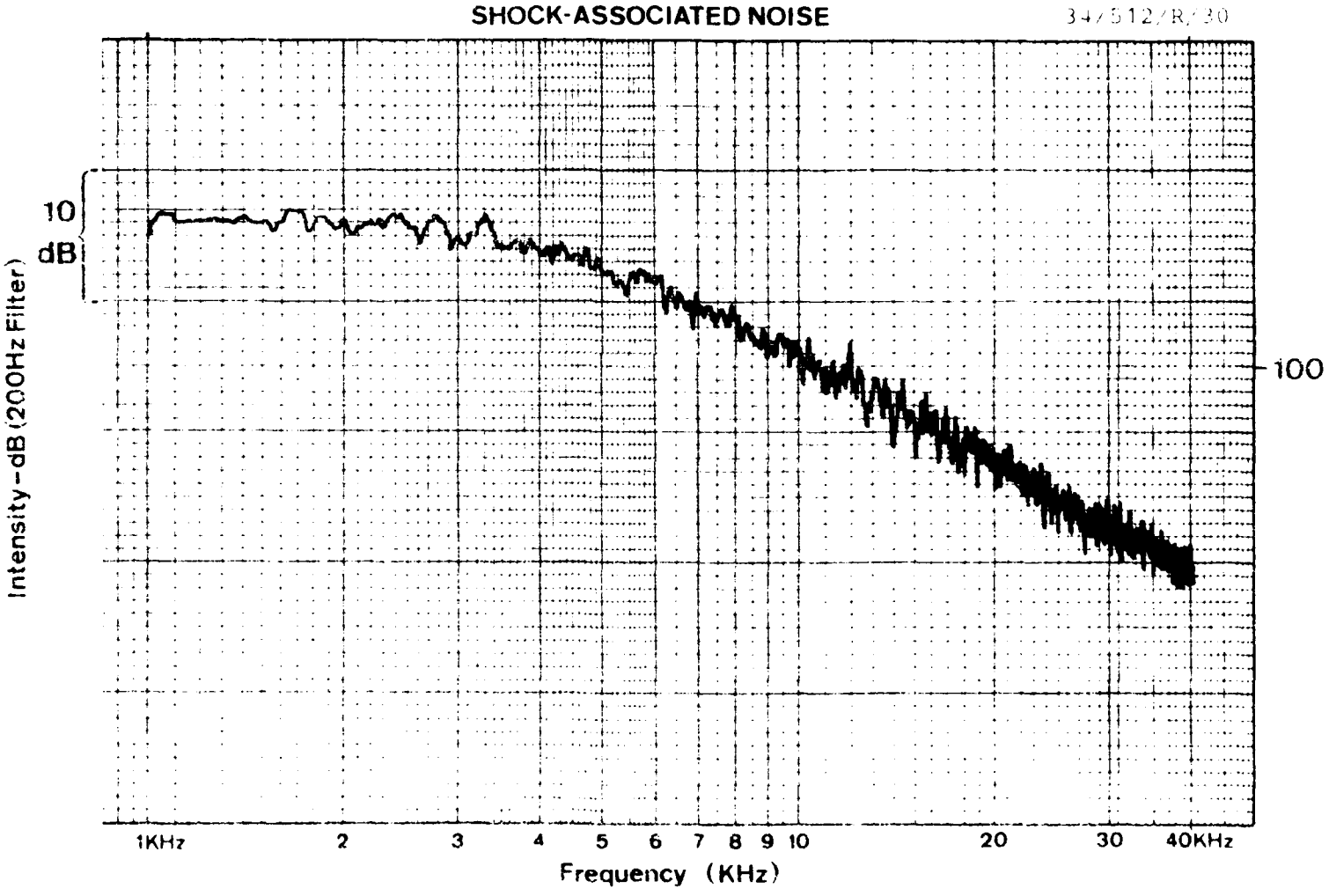
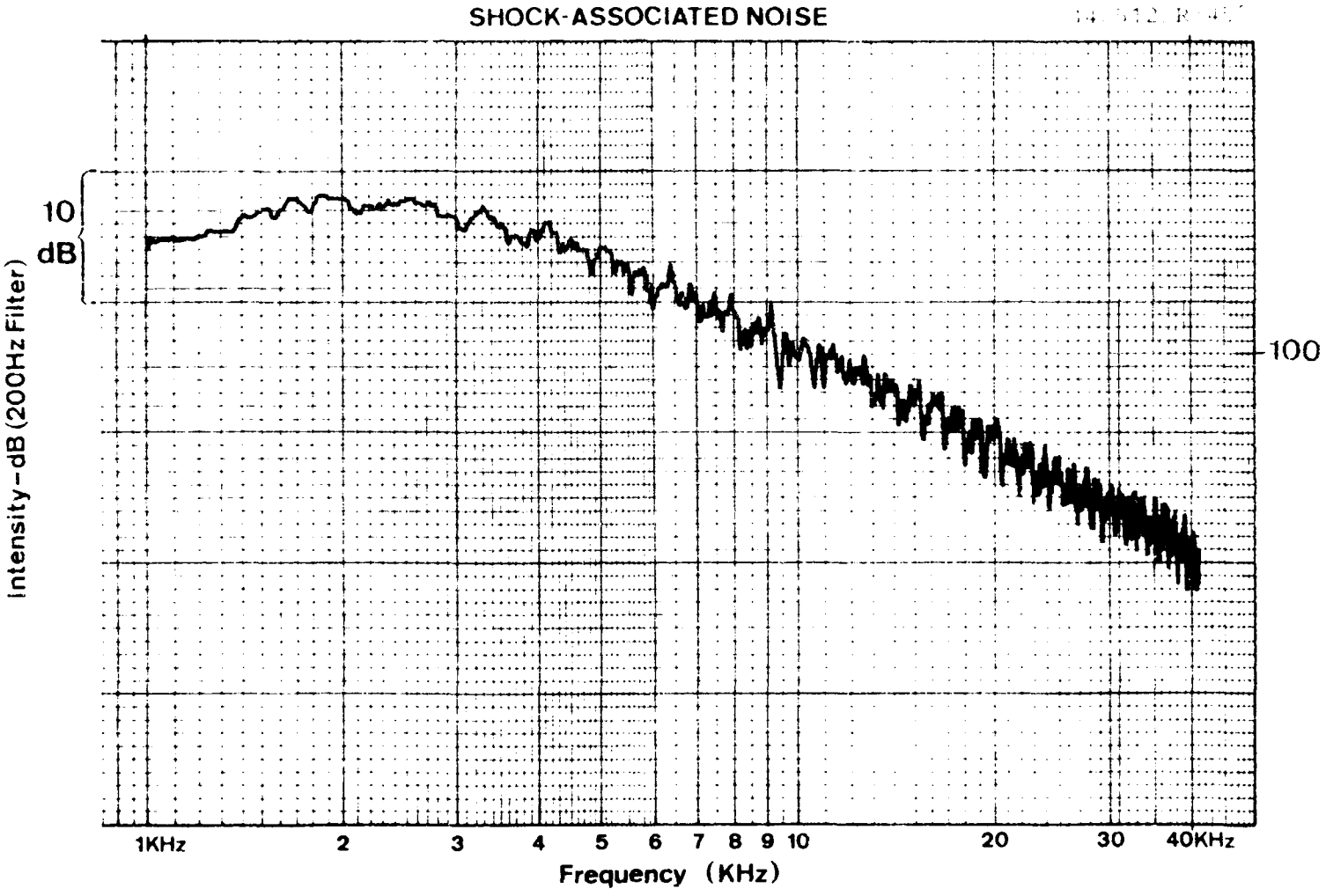
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
34/512/R/30
10
dB
Intensity-dB (200Hz Filter)
100
1KHz
2
3
4
5
6
7
8
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
10
dB
Intensity-dB (200Hz Filter)
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1KHz
2
3
4
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7
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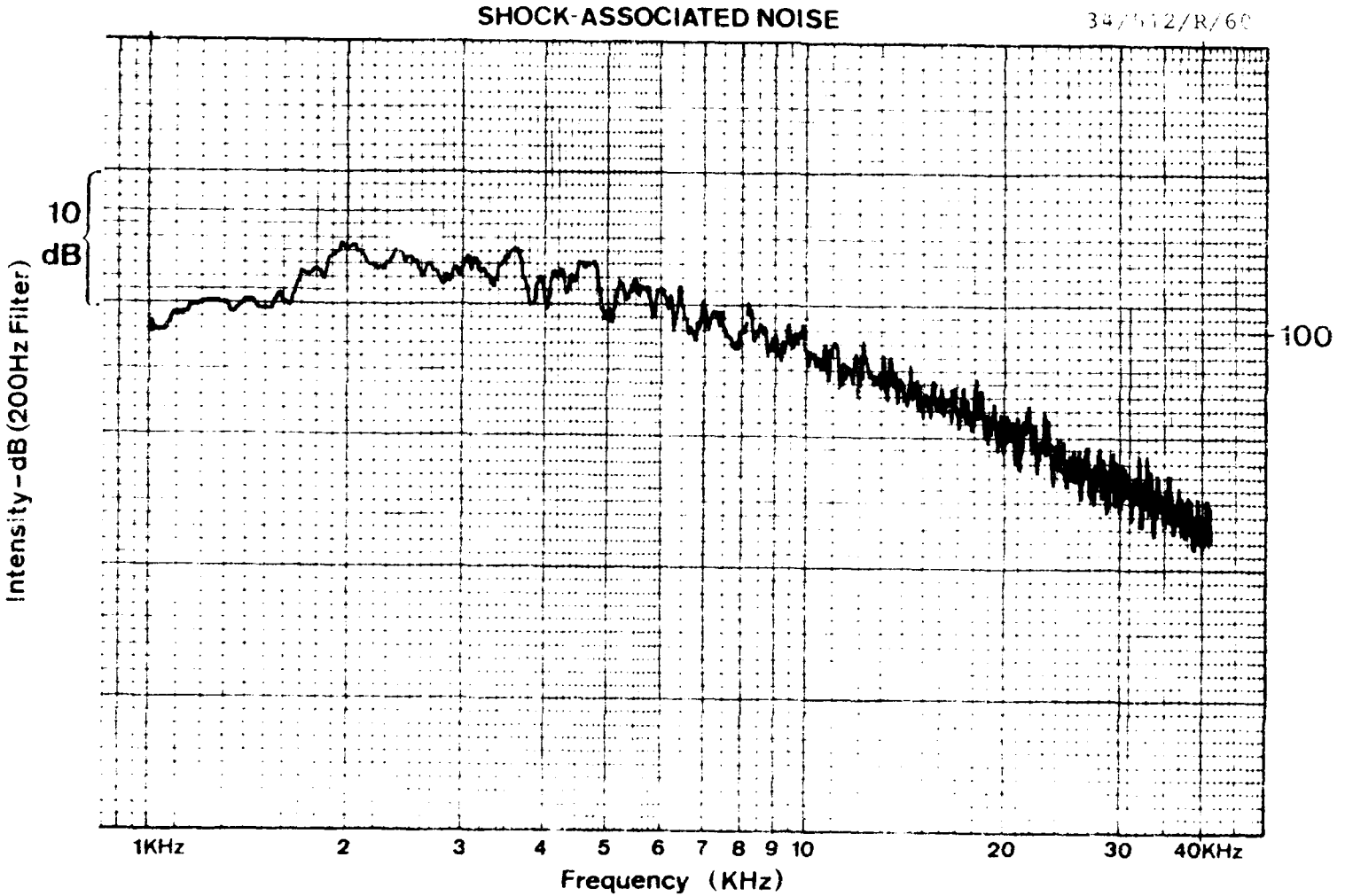
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
10
dB
Intensity-dB (200Hz Filter)
100
1KHz
2
3
4
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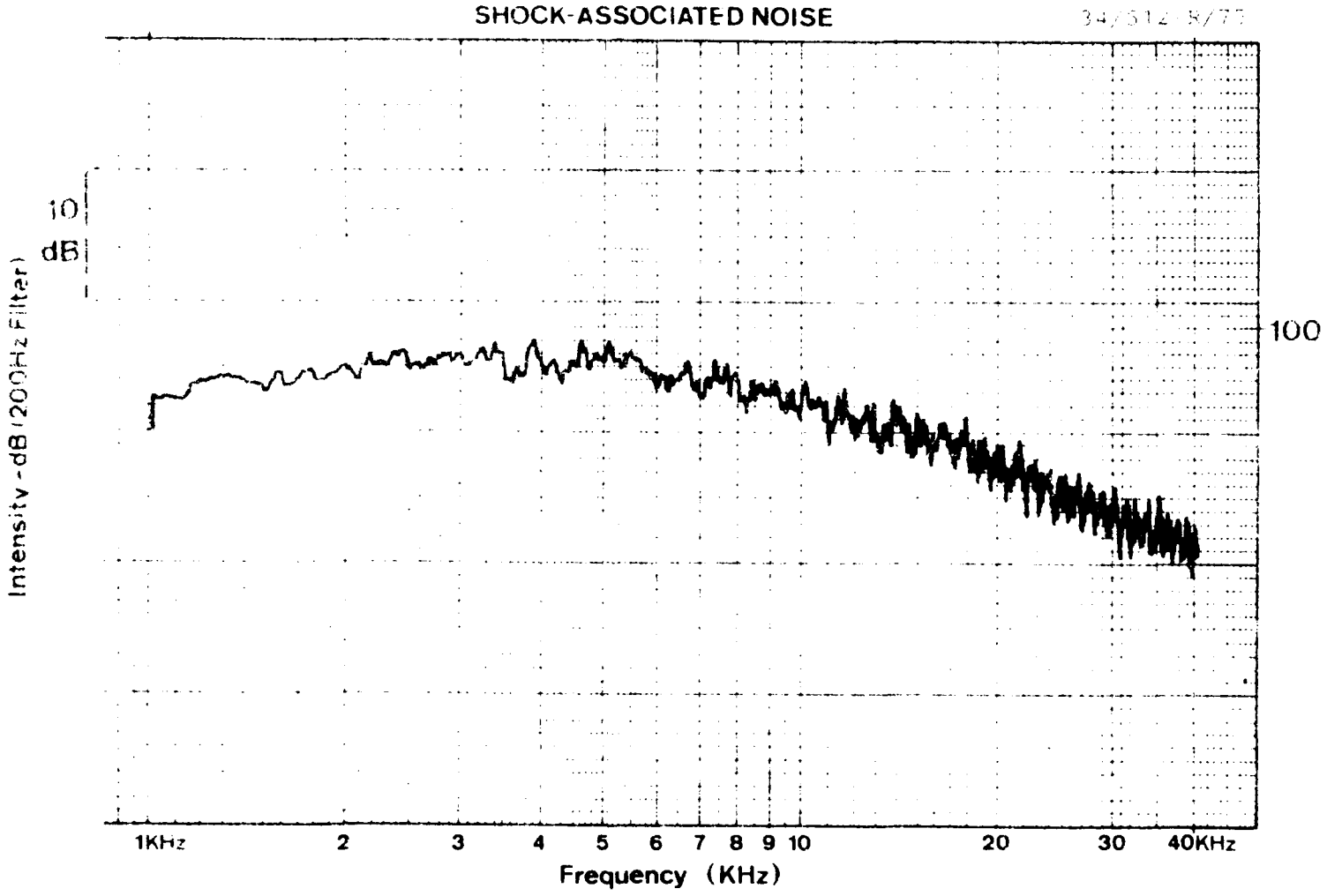
6
7
8
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
10
dB
Intensity - dB (200Hz Filter)
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1KHz
2
3
4
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6
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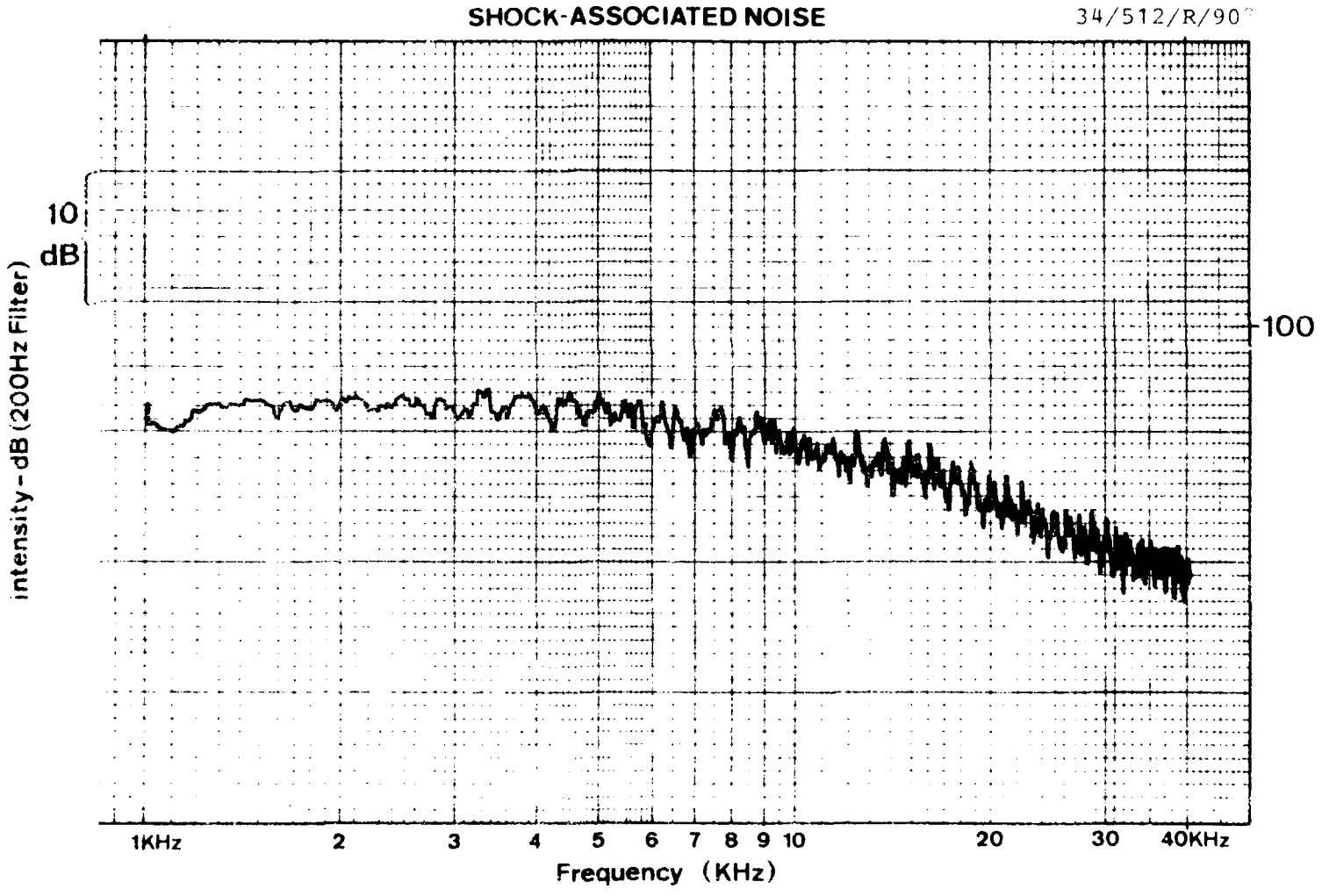
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
34/512/R/90°
10
dB
100
Intensity - dB (200Hz Filter)
1KHz
2
3
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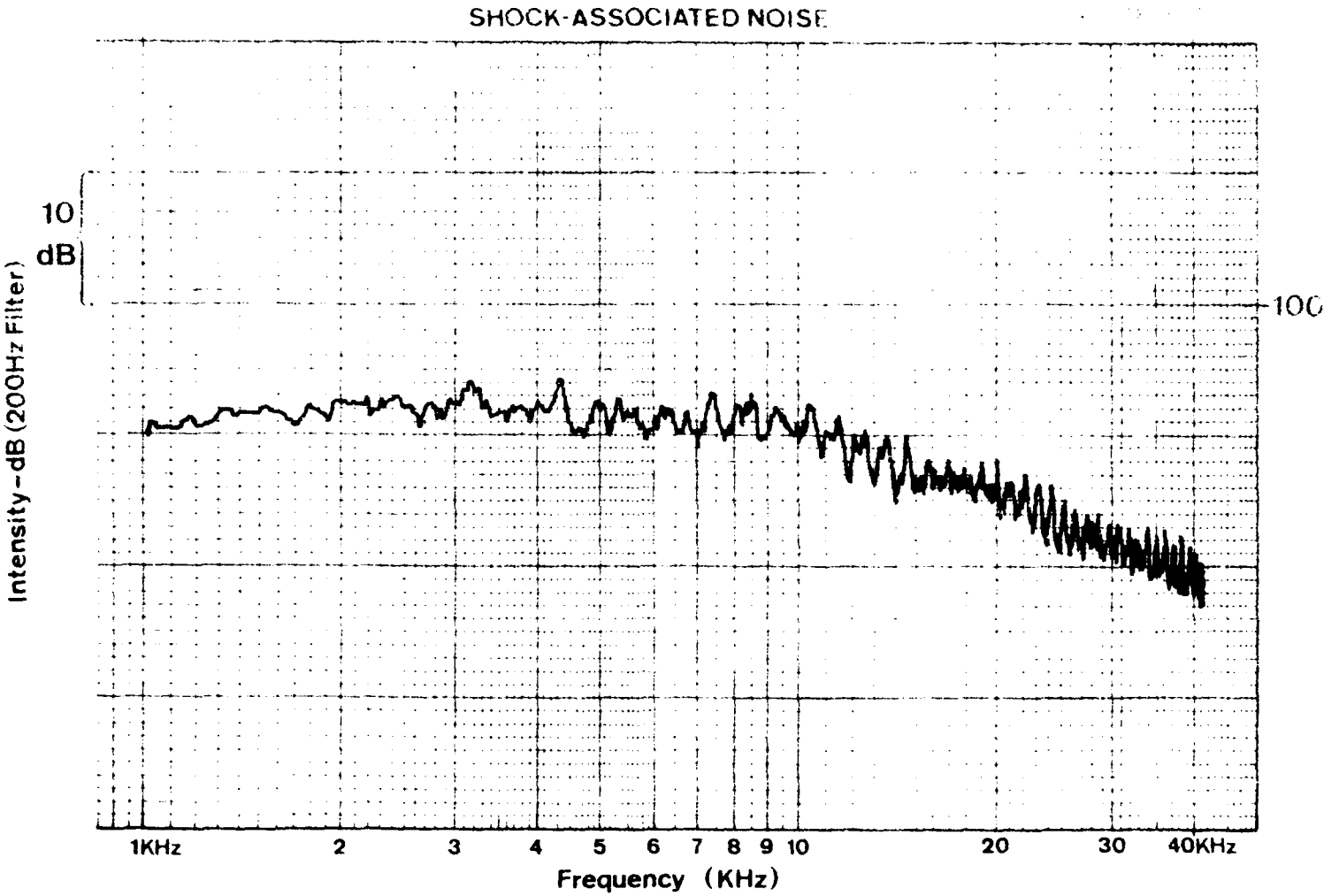
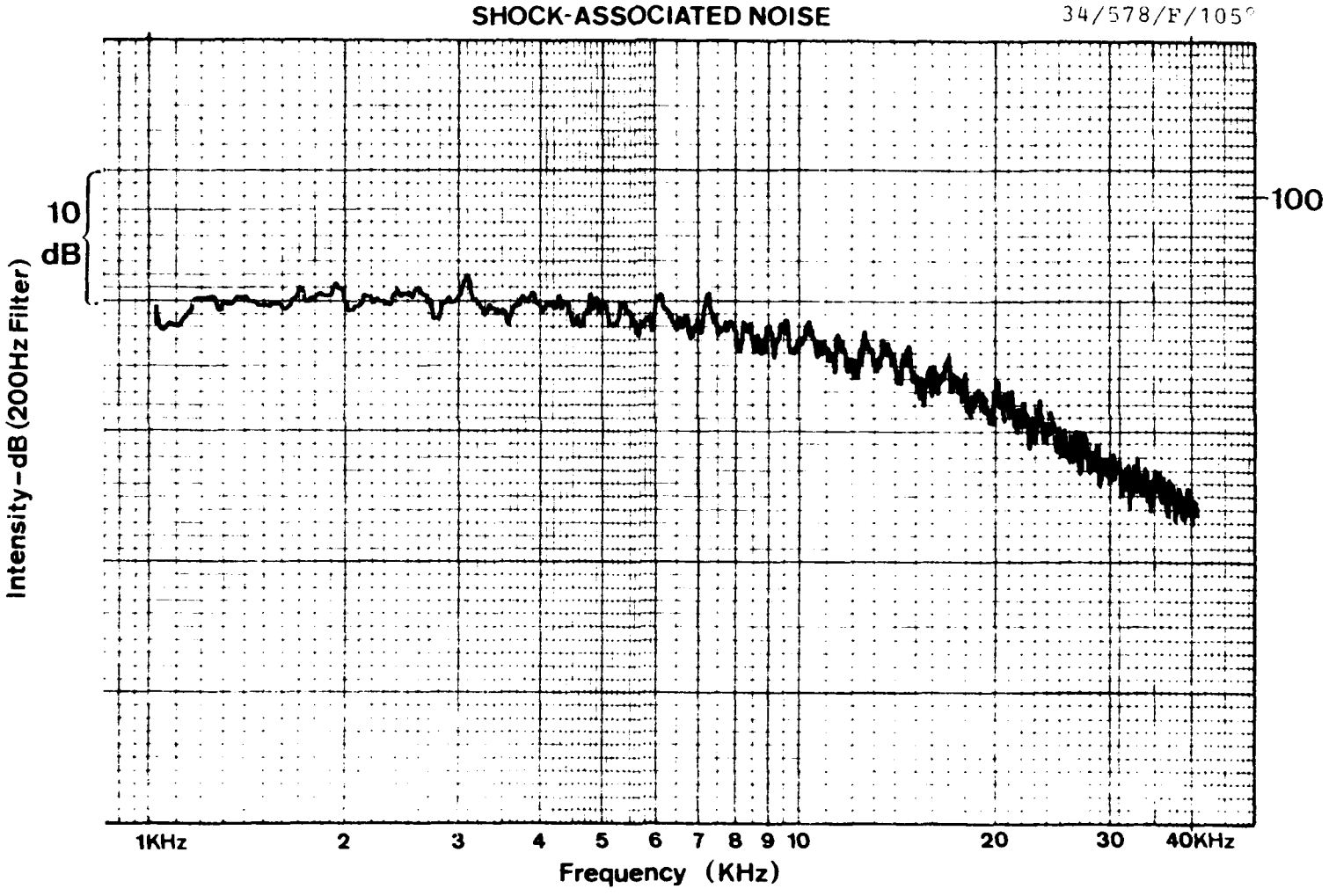
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
10
dB
100
Intensity-dB (200Hz Filter)
1KHz
2
3
4
5
6
7
8
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
34/578/F/105°
10
dB
100
Intensity-dB (200Hz Filter)
1KHz
2
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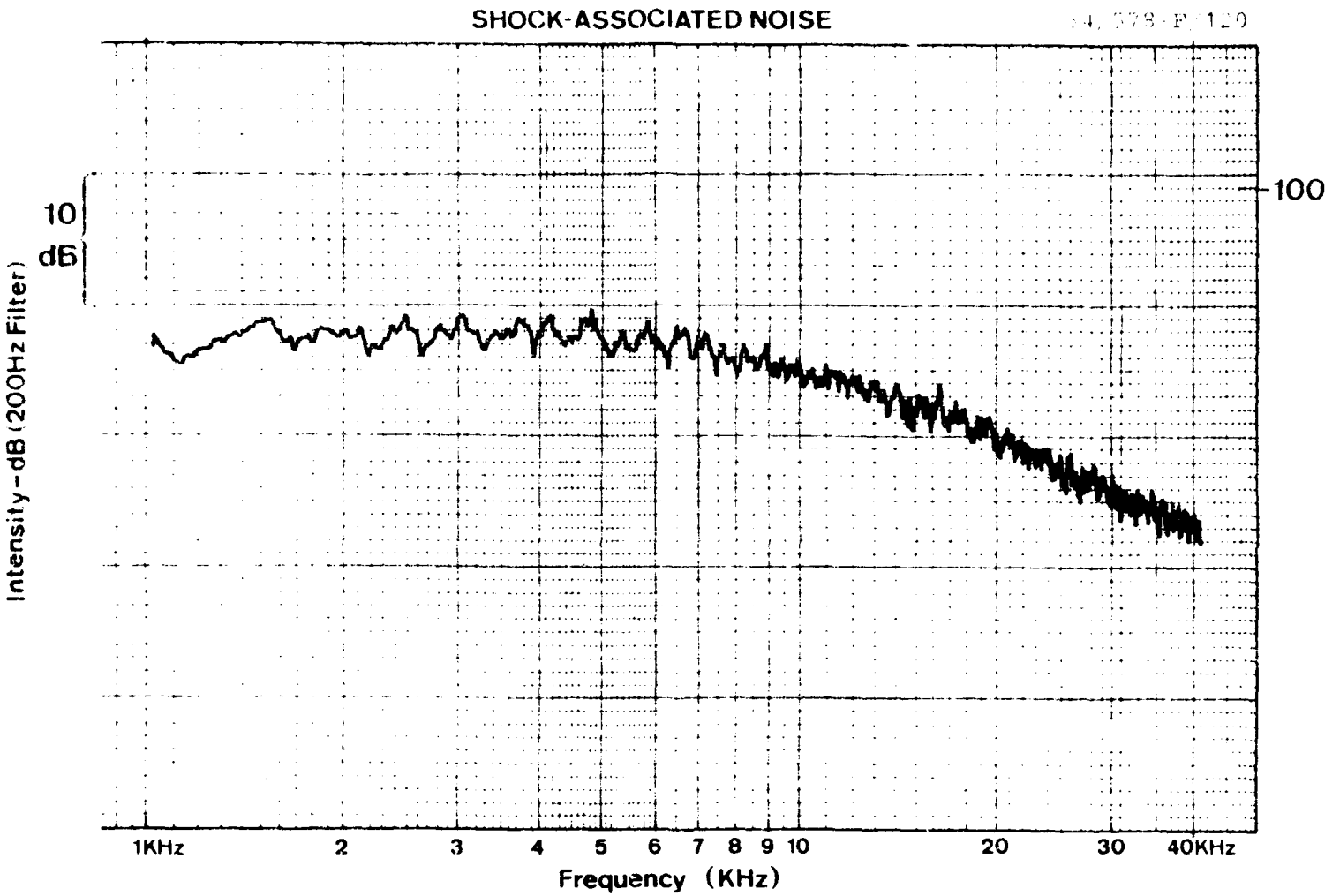
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
10
dB
100
Intensity - dB (200Hz Filter)
1KHz
2
3
4
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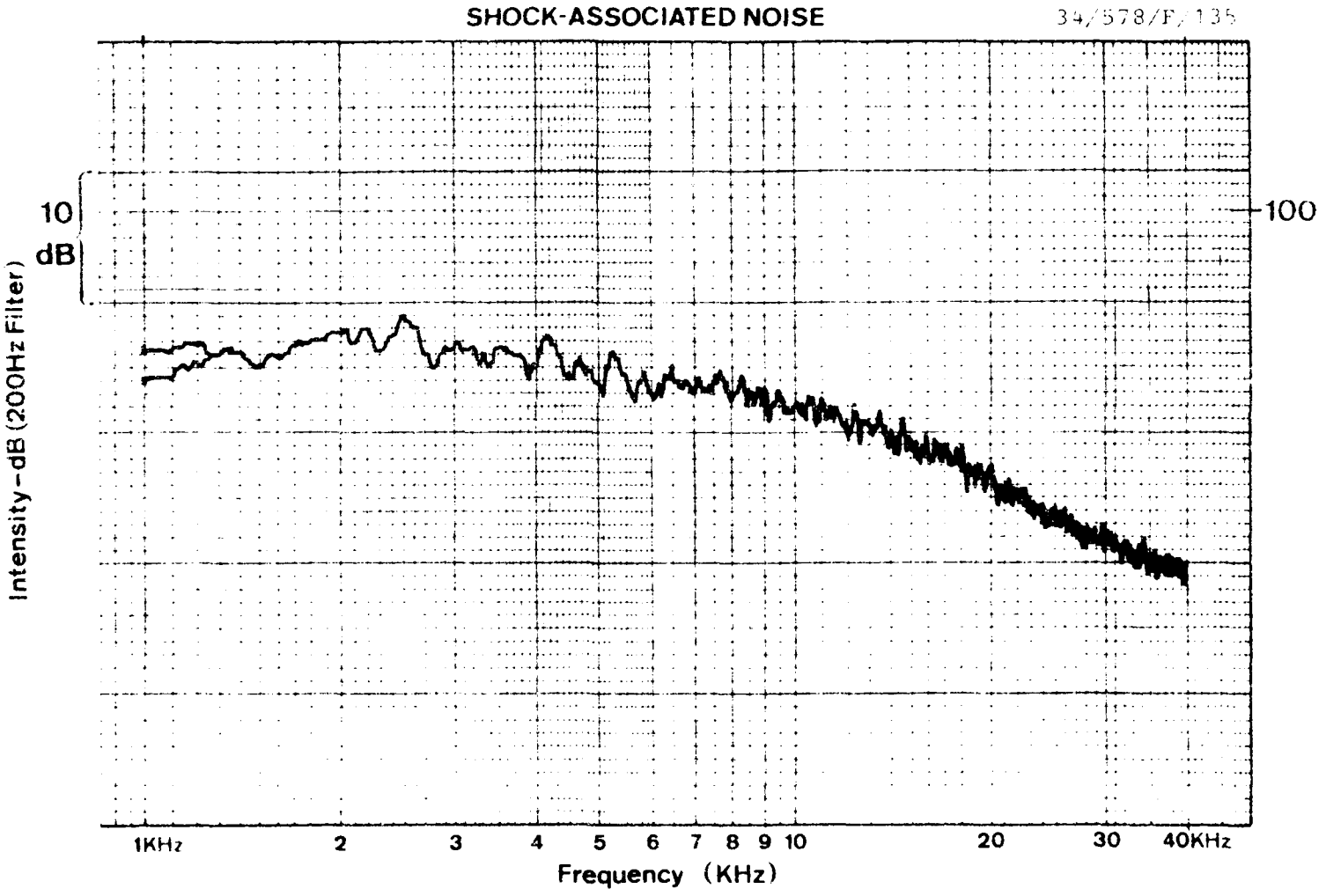
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
34/578/F/135
10
dB
100
Intensity - dB (200Hz Filter)
1KHz
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9
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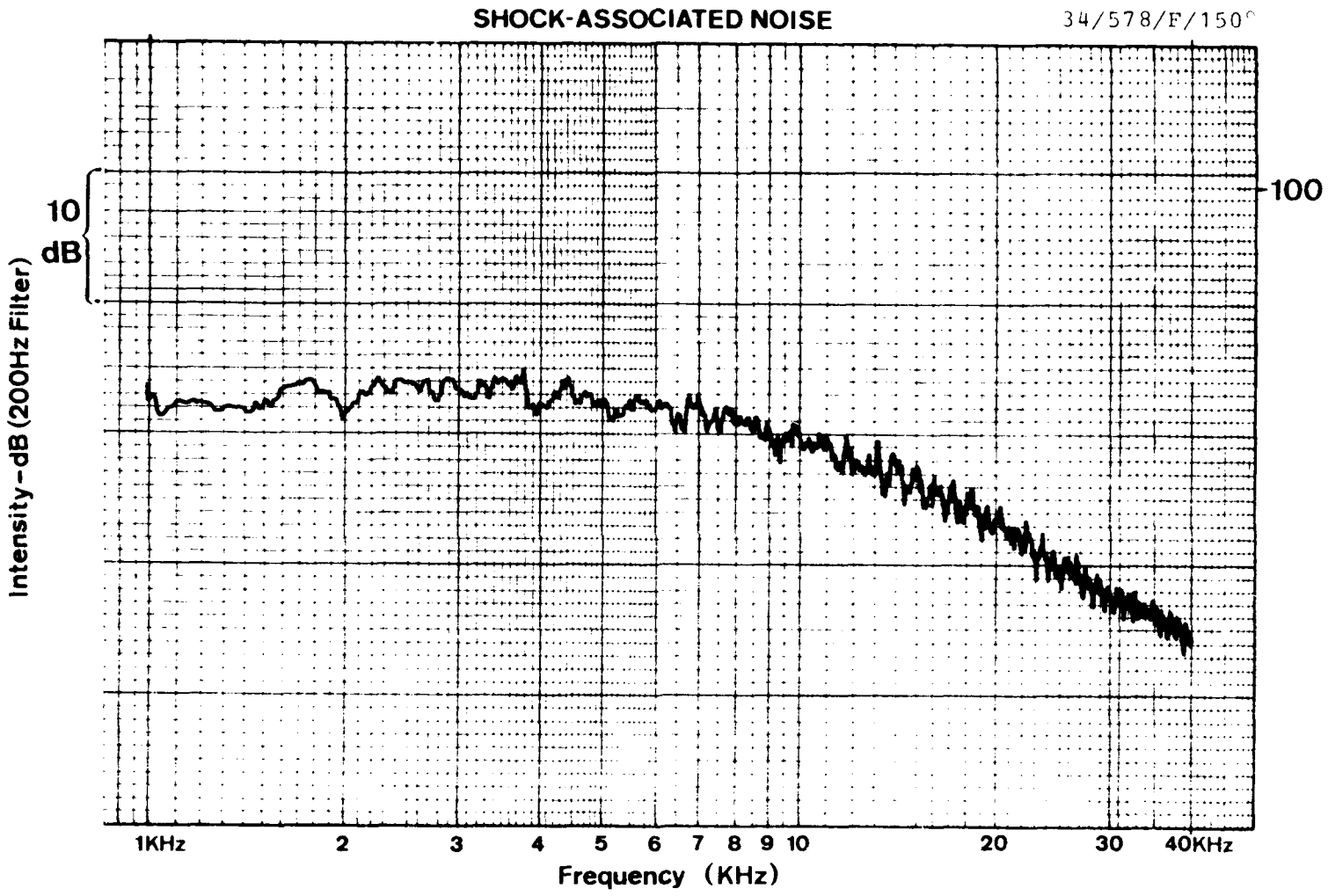
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
34/578/F/150°
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dB
100
Intensity-dB (200Hz Filter)
1KHz
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9
10
20
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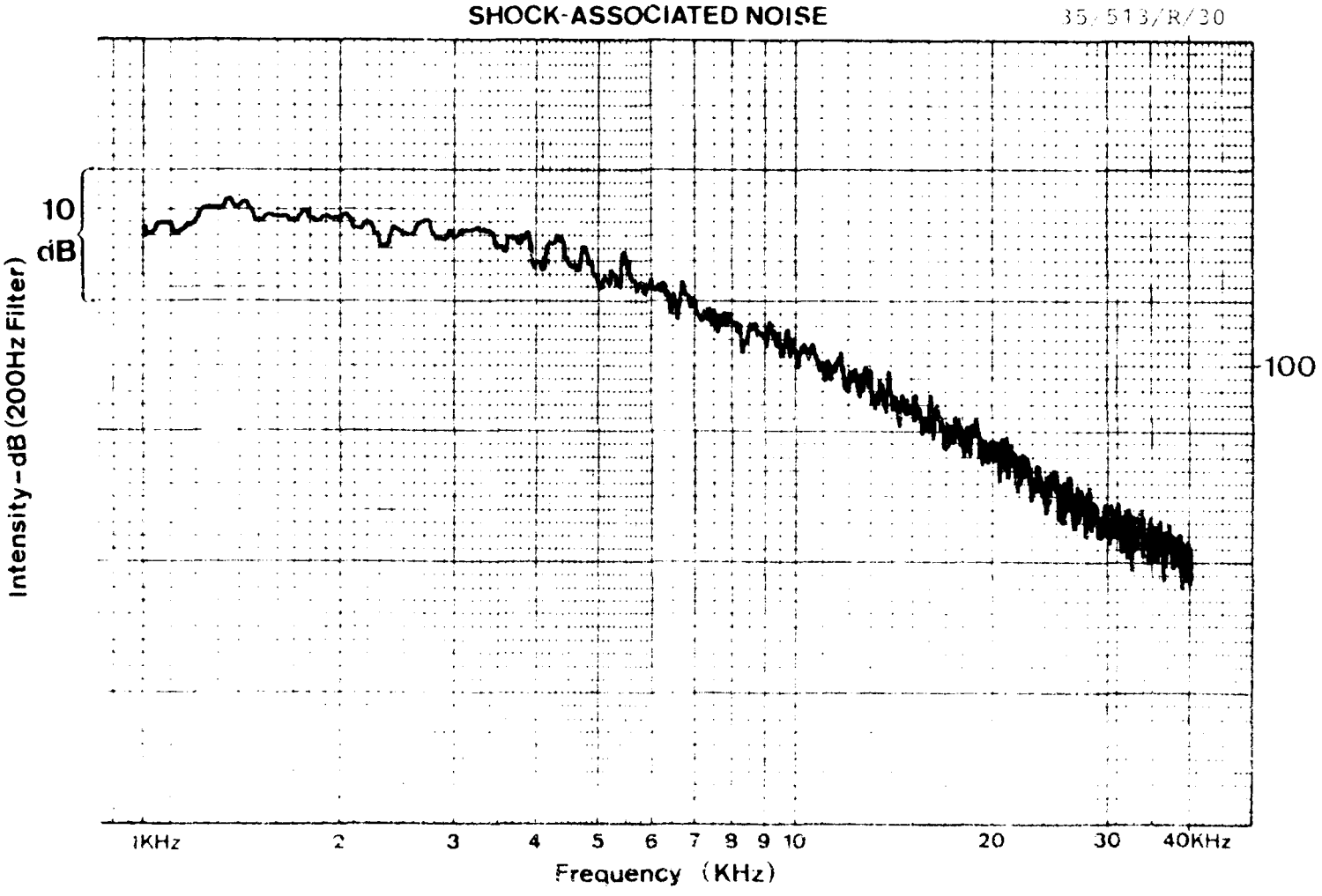
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
35/513/R/30
10
dB
Intensity-dB (200Hz Filter)
100
1KHz
2
3
4
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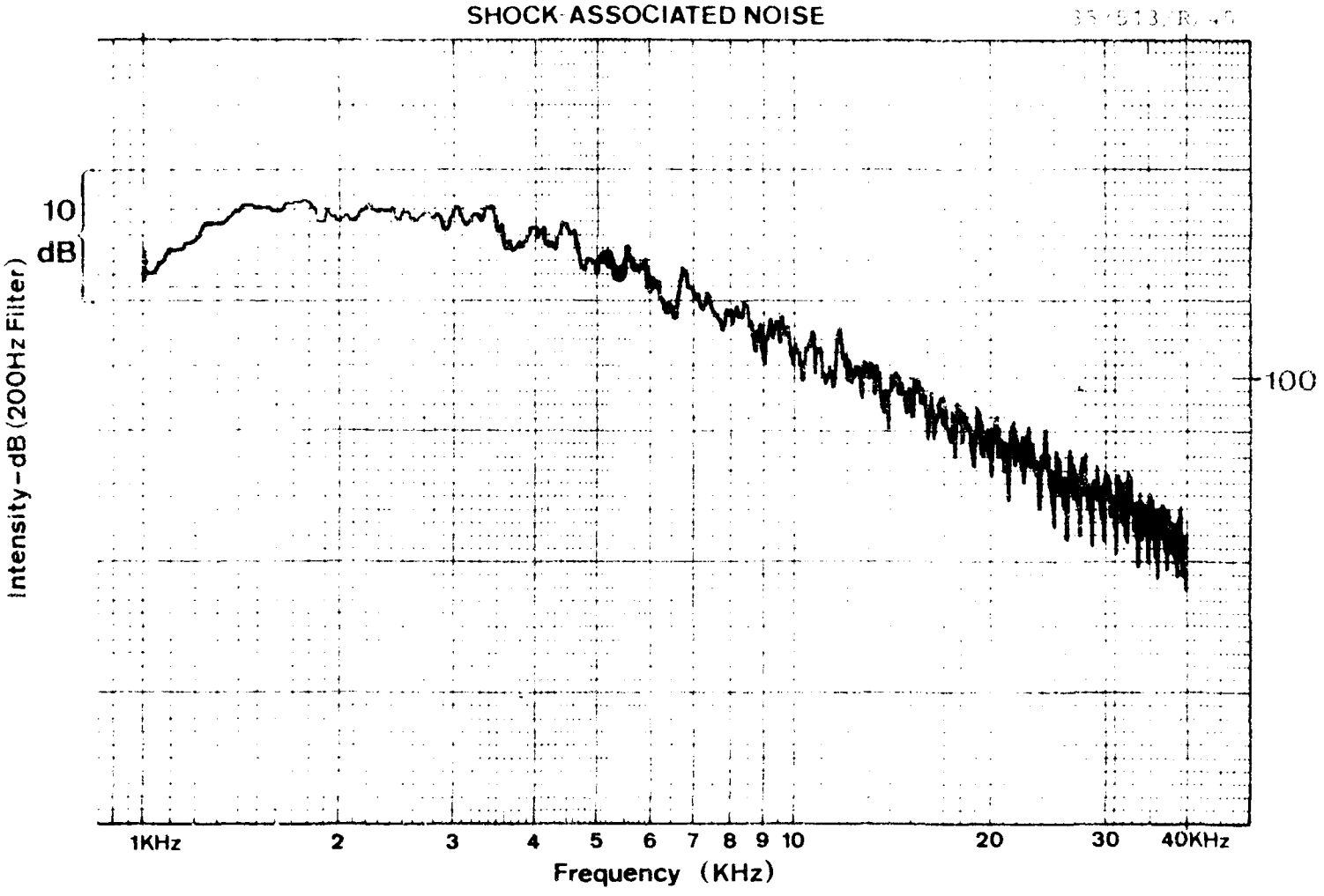
7
8
9
10
20
30
40KHz
Frequency (KHz)


SHOCK ASSOCIATED NOISE
10
dB
Intensity – dB (200Hz Filter)
100
1KHz
2
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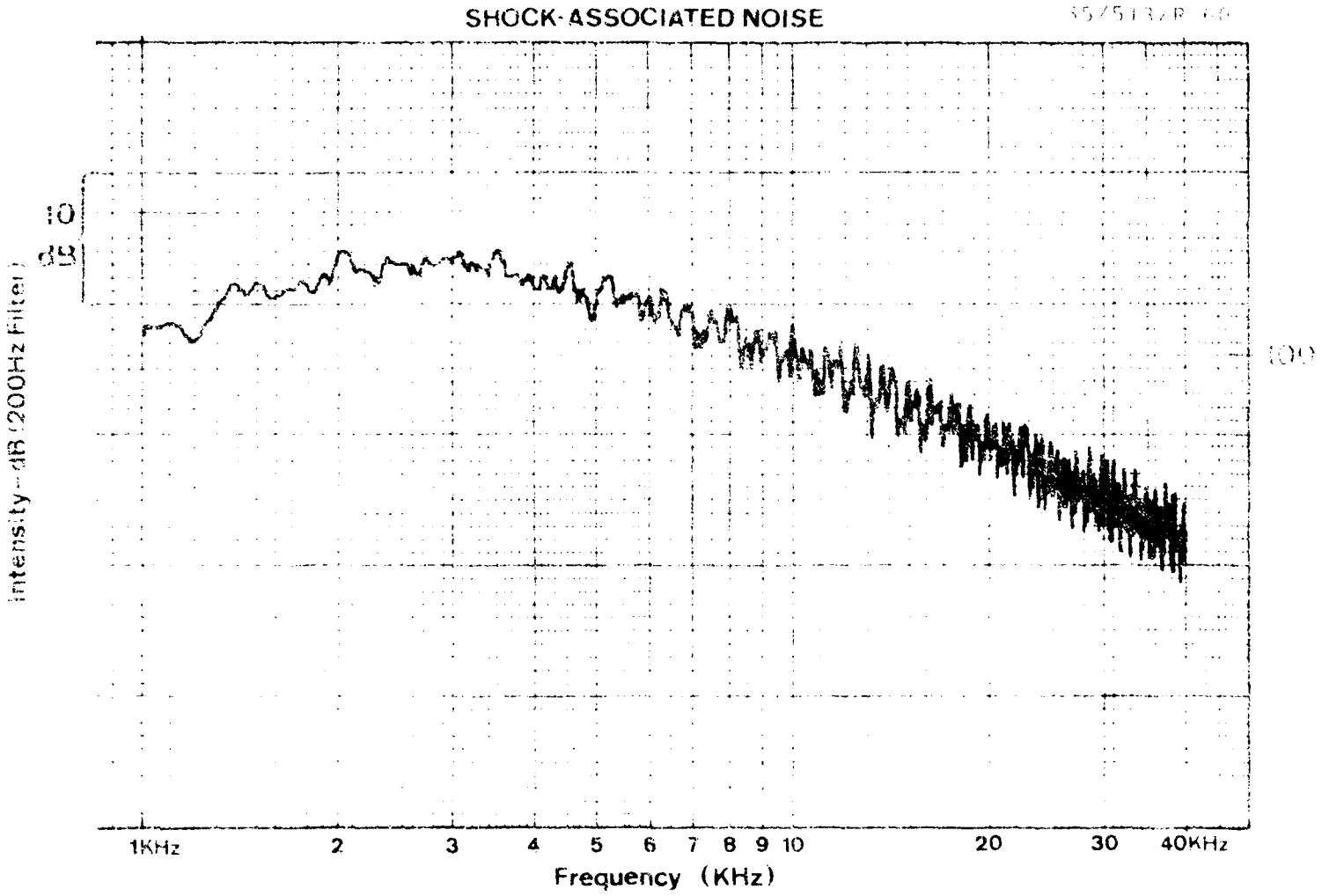
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
10
dB
Intensity—dB (200Hz Filter)
1KHz
2
3
4
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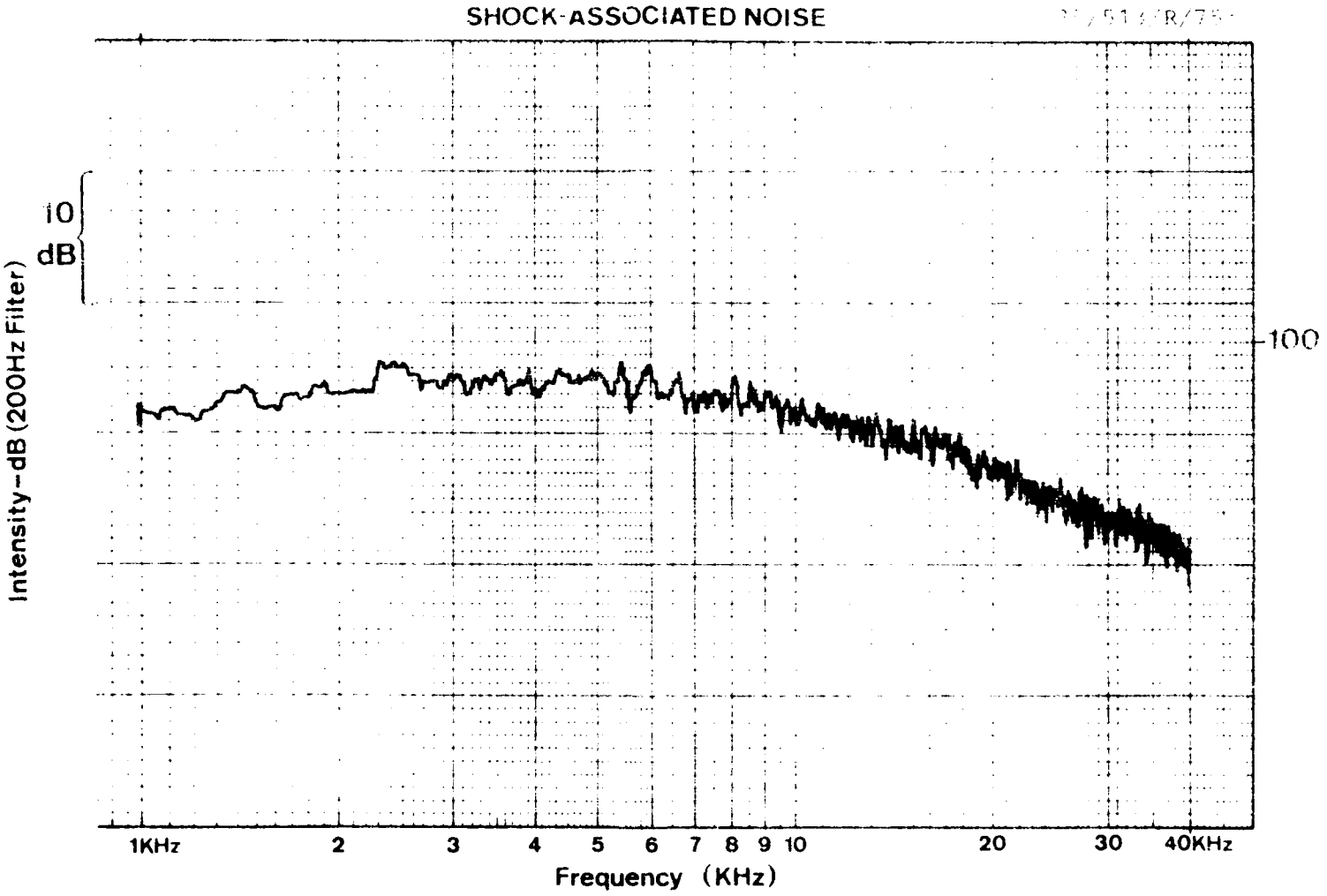
8
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
10
dB
Intensity-dB (200Hz Filter)
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1KHz
2
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5
6
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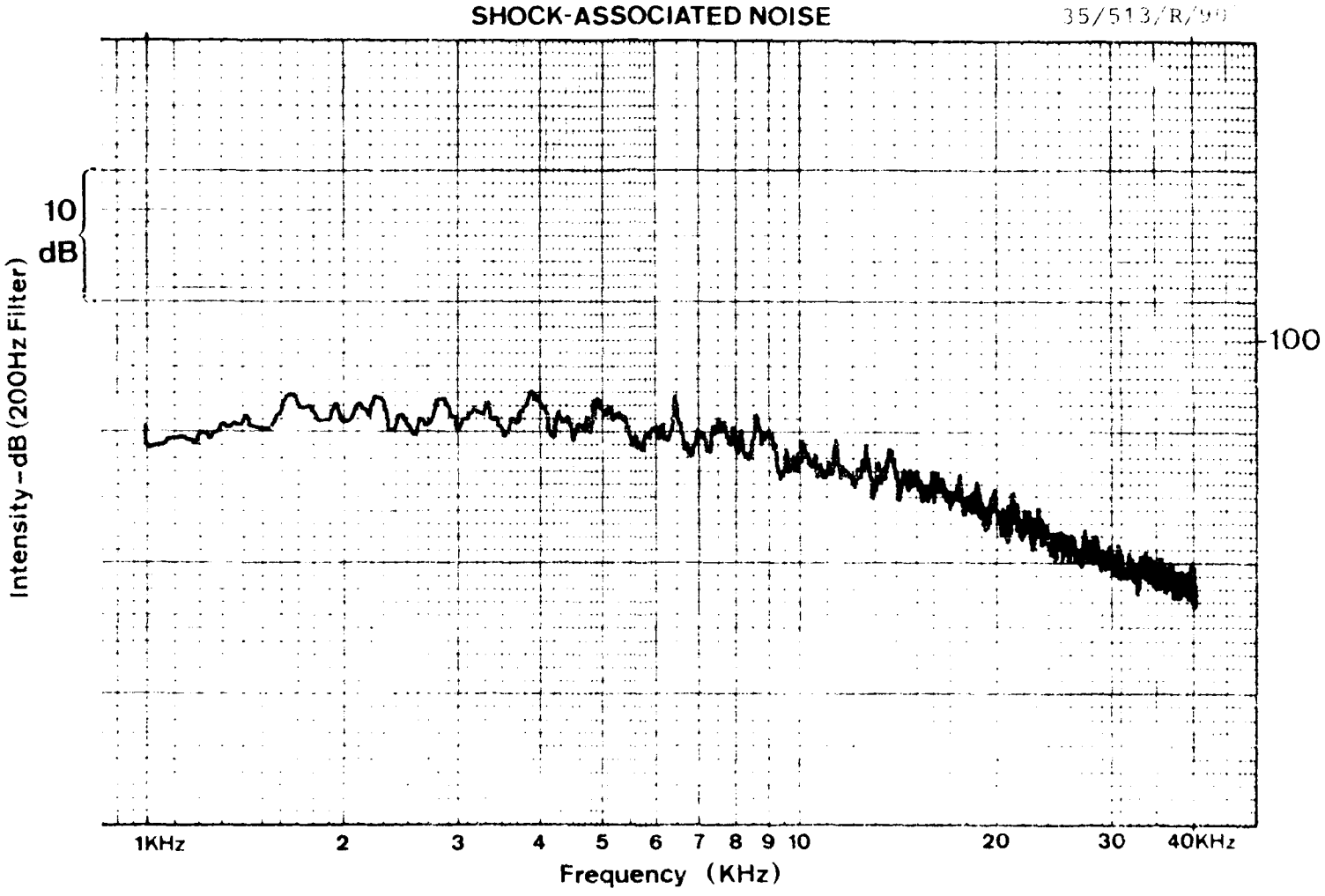
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
35/513/R/90
10
dB
Intensity - dB (200Hz Filter)
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1KHz
2
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4
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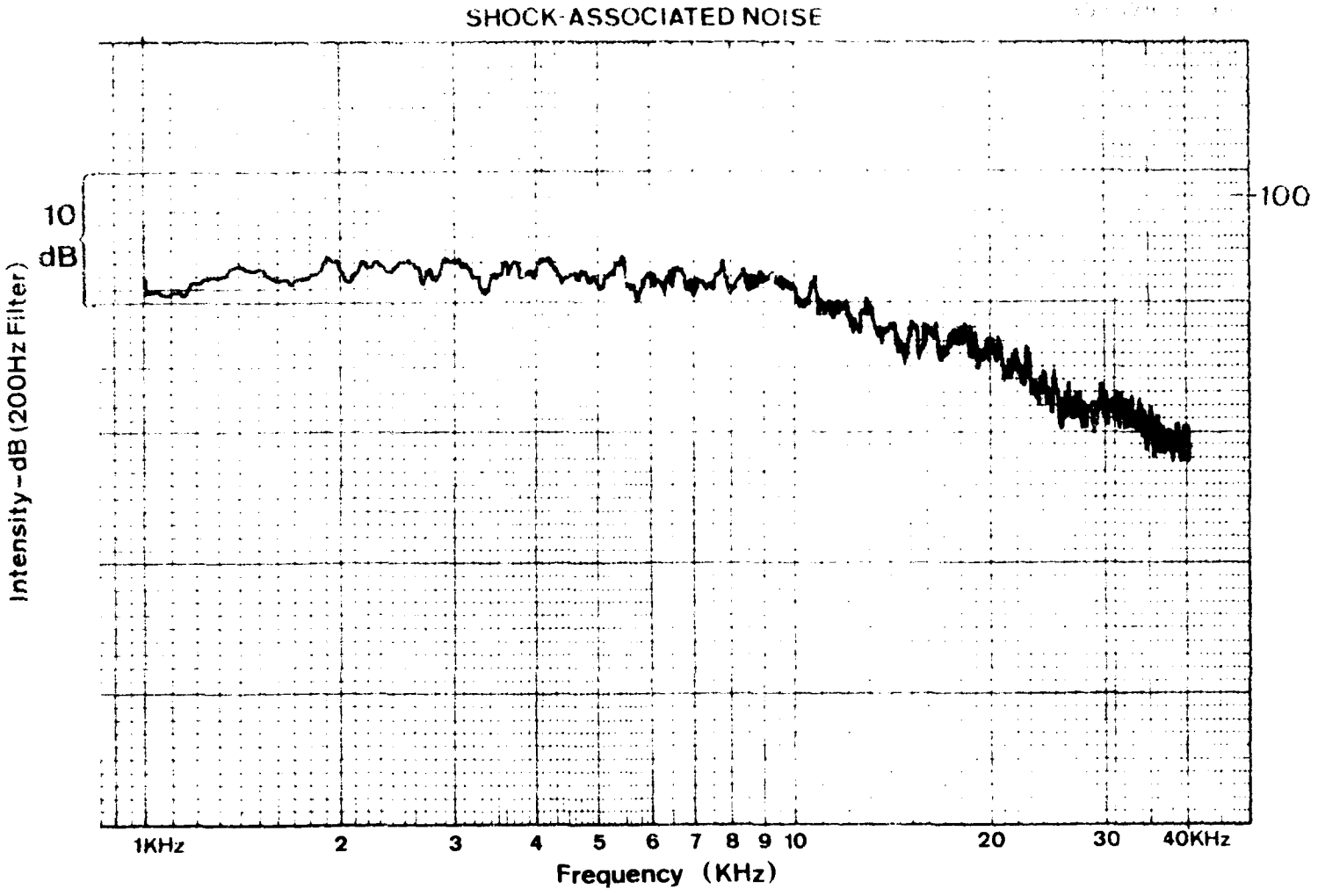
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
10
dB
100
Intensity - dB (200Hz Filter)
1KHz
2
3
4
5
6
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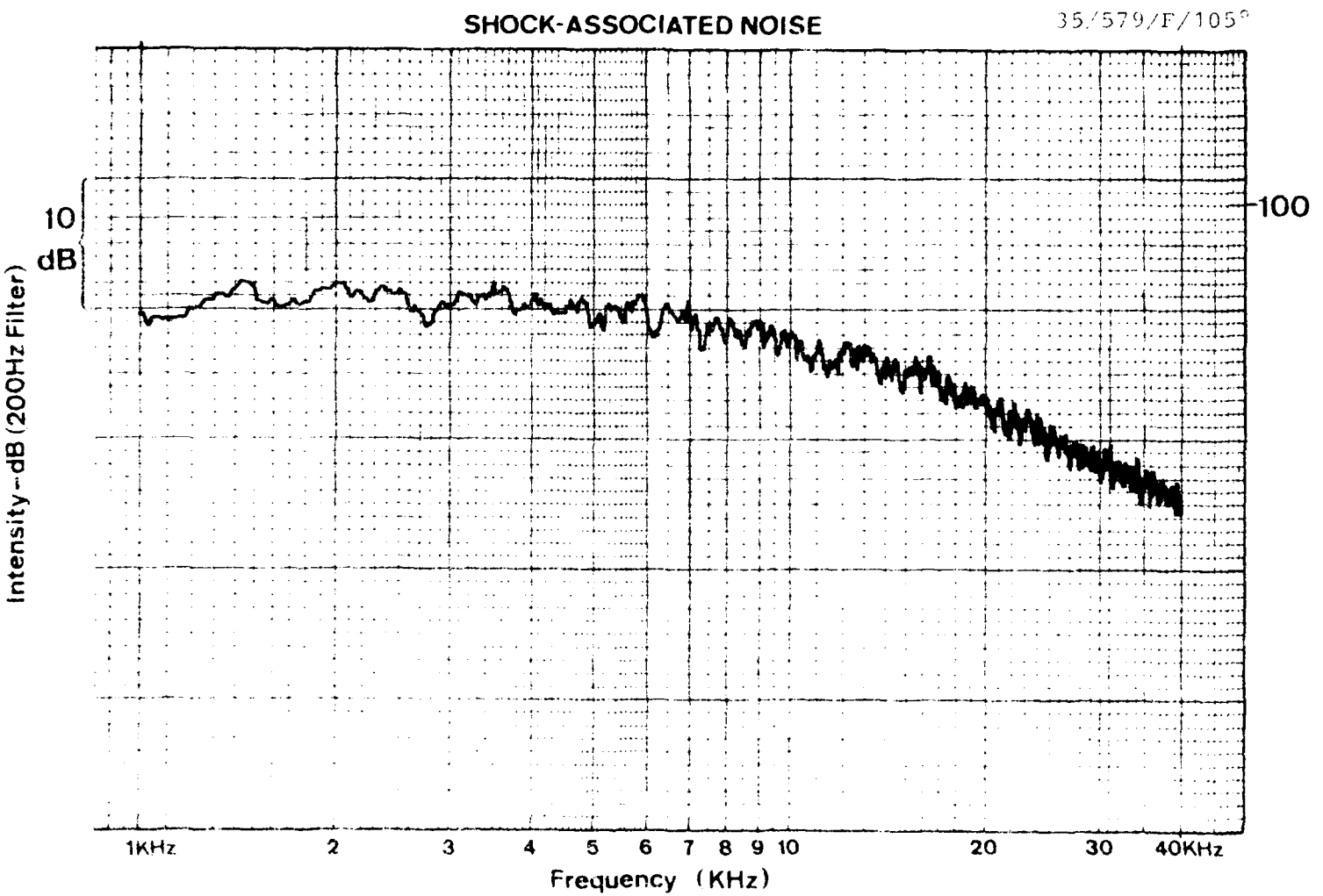
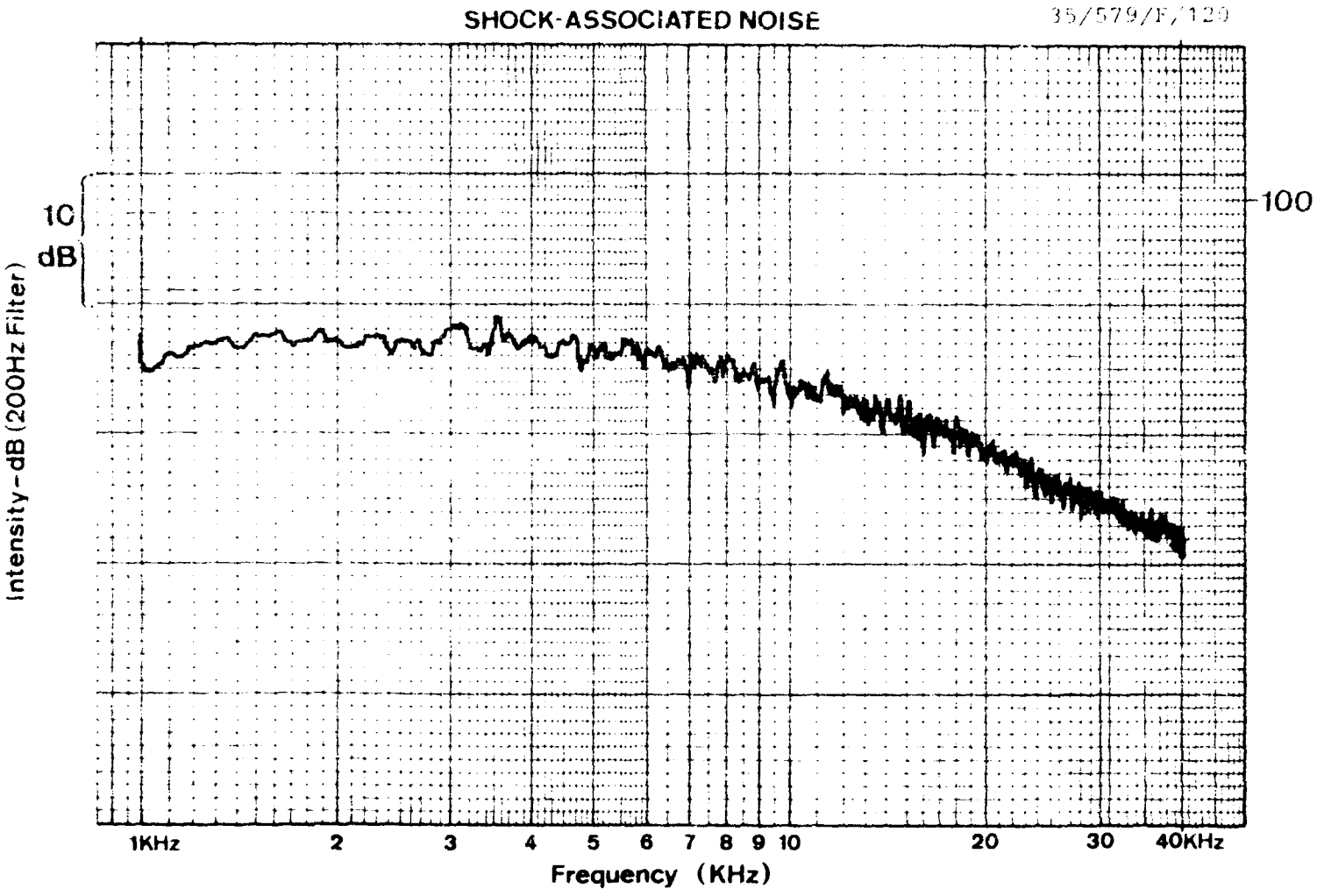
8
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
35/579/F/105°
10
dB
100
Intensity - dB (200Hz Filter)
1KHz
2
3
4
5
6
7
8
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
35/579/F/129
10 dB
100
Intensity - dB (200Hz Filter)
1KHz
2
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4
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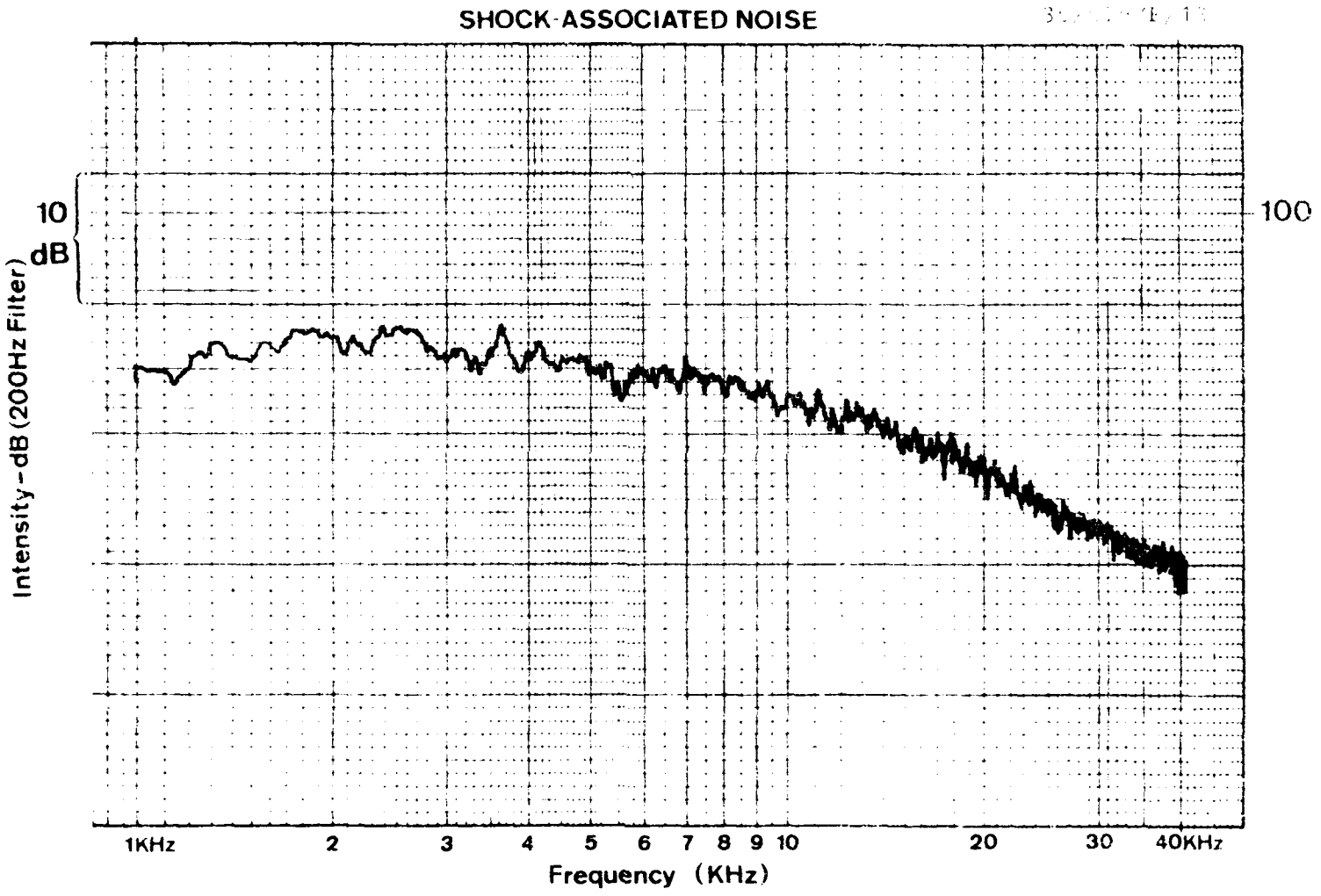
7
8
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
10
dB
100
Intensity - dB (200Hz Filter)
1KHz
2
3
4
5
6
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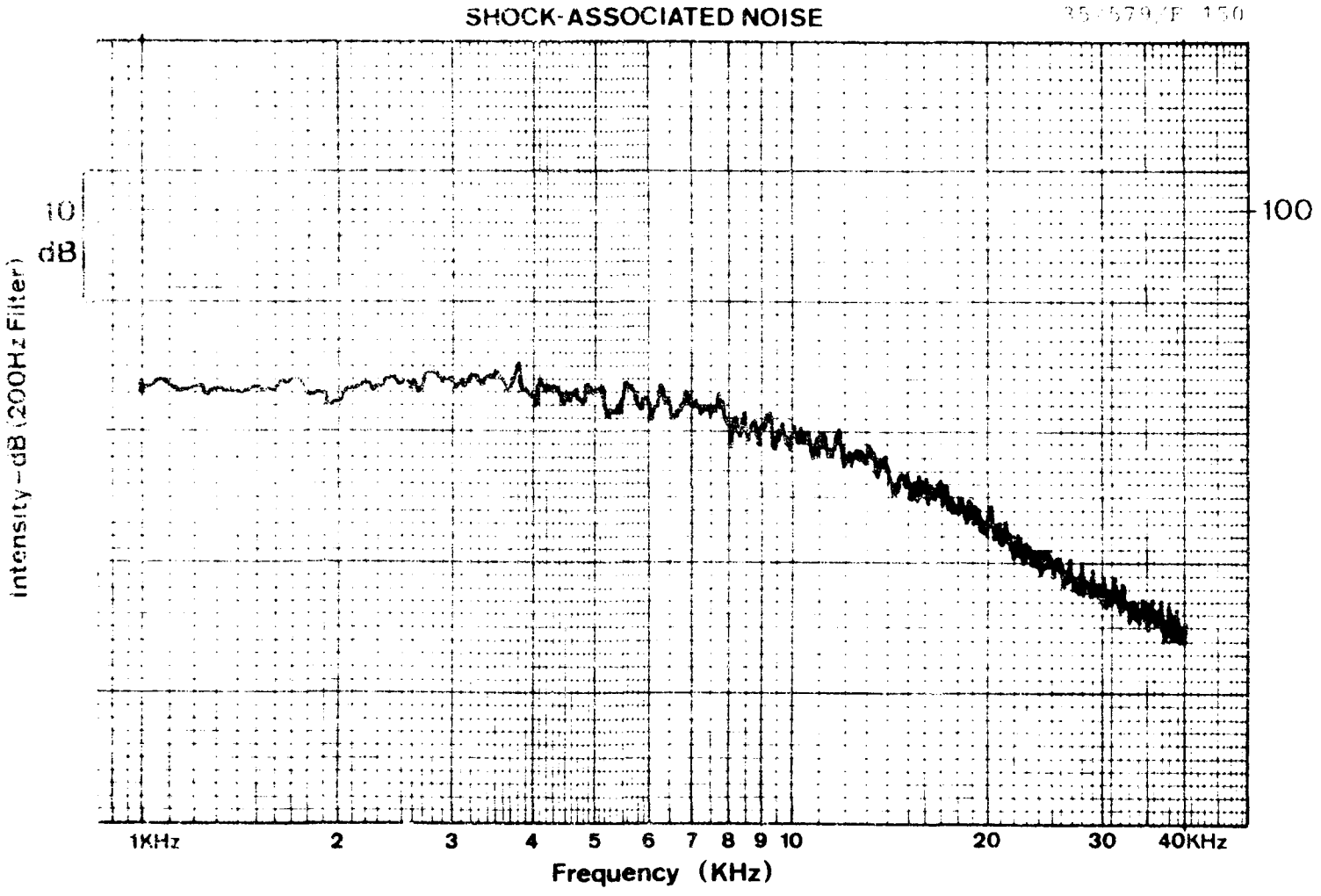
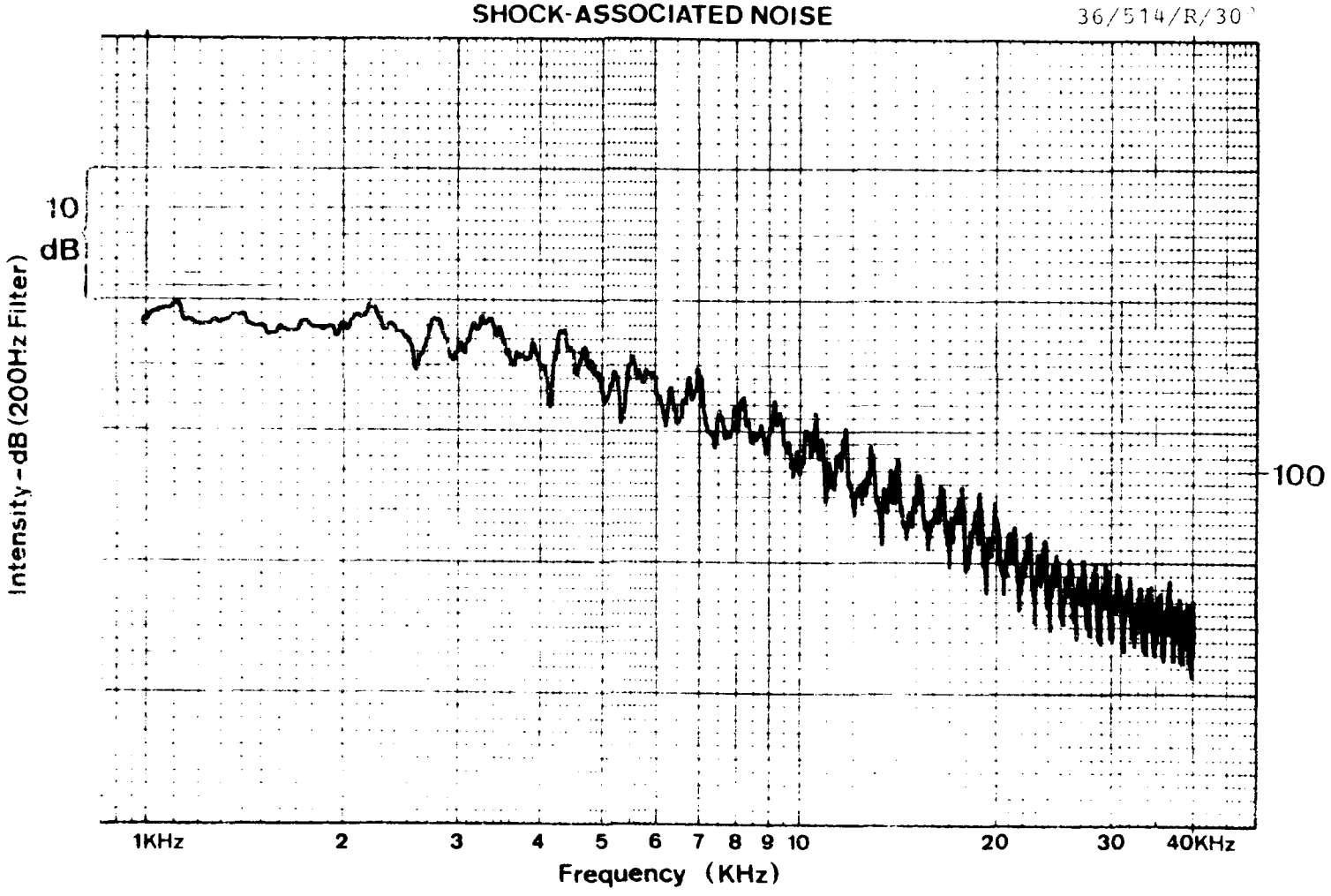
8
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
10
dB
100
Intensity-dB (200Hz Filter)
1KHz
2
3
4
5
6
7
8
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
36/514/R/30
10
dB
Intensity - dB (200Hz Filter)
100
1KHz
2
3
4
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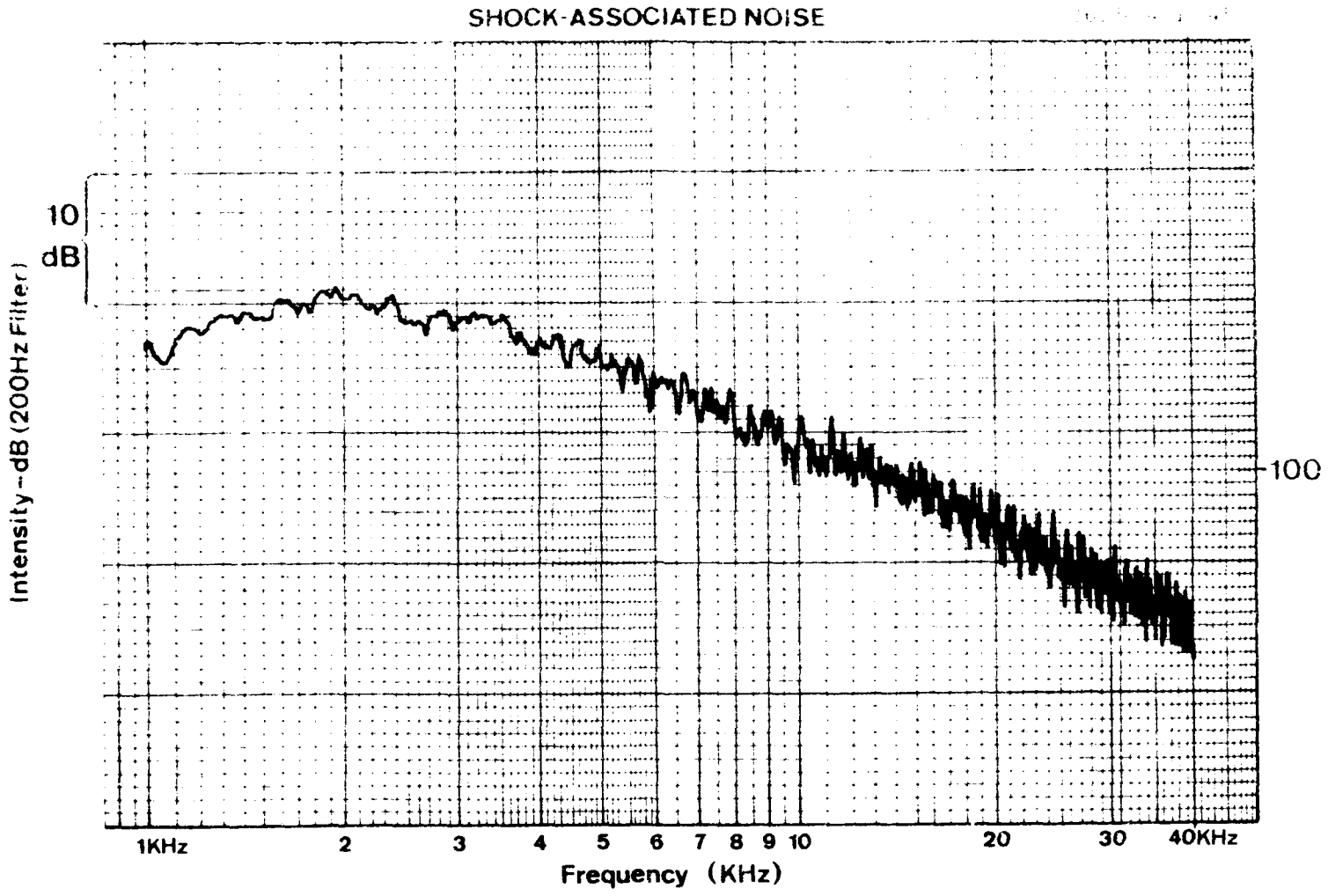
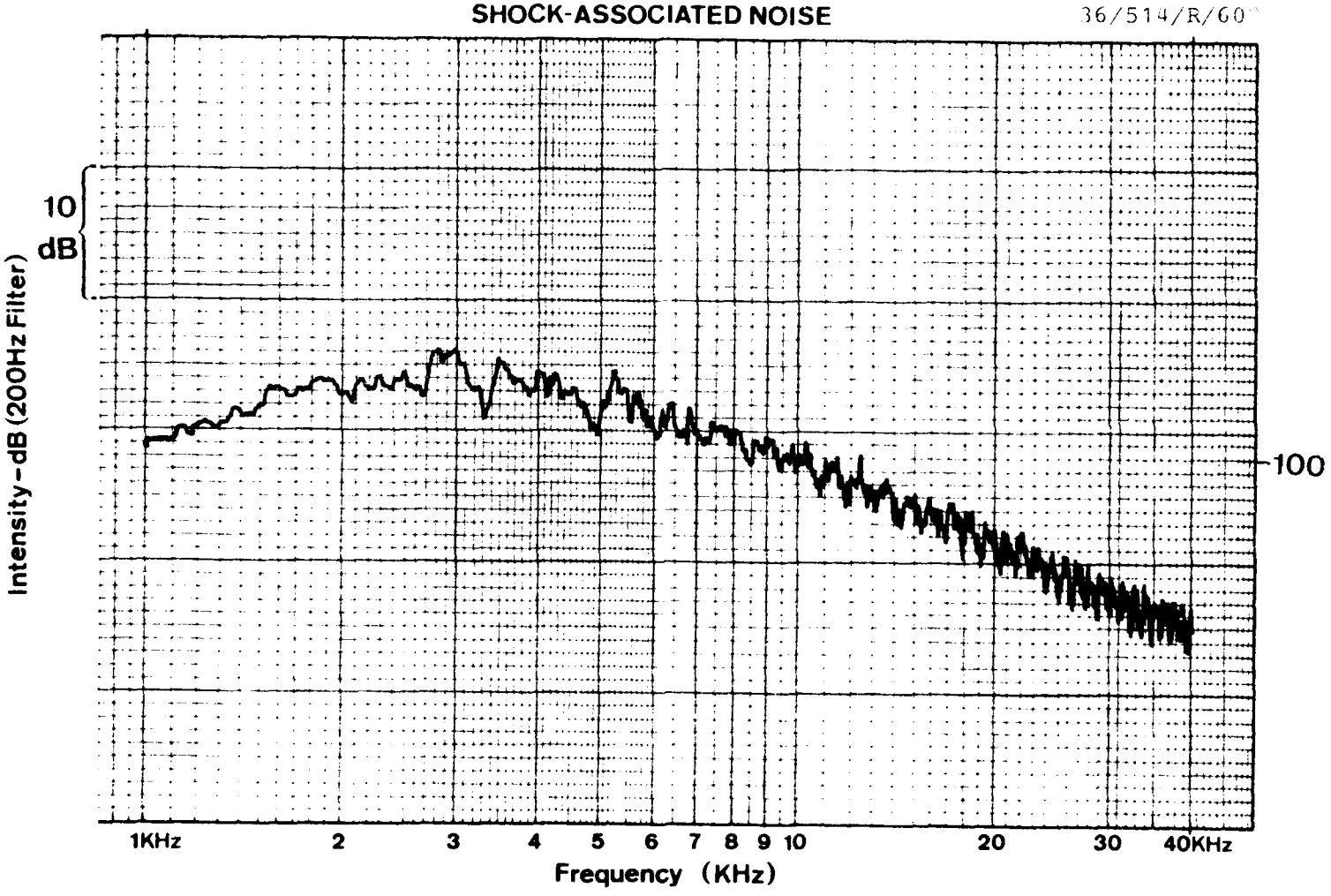
8
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
10
dB
Intensity - dB (200Hz Filter)
100
1KHz
2
3
4
5
6
7
8
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
36/514/R/60
10
dB
Intensity-dB (200Hz Filter)
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1KHz
2
3
4
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6
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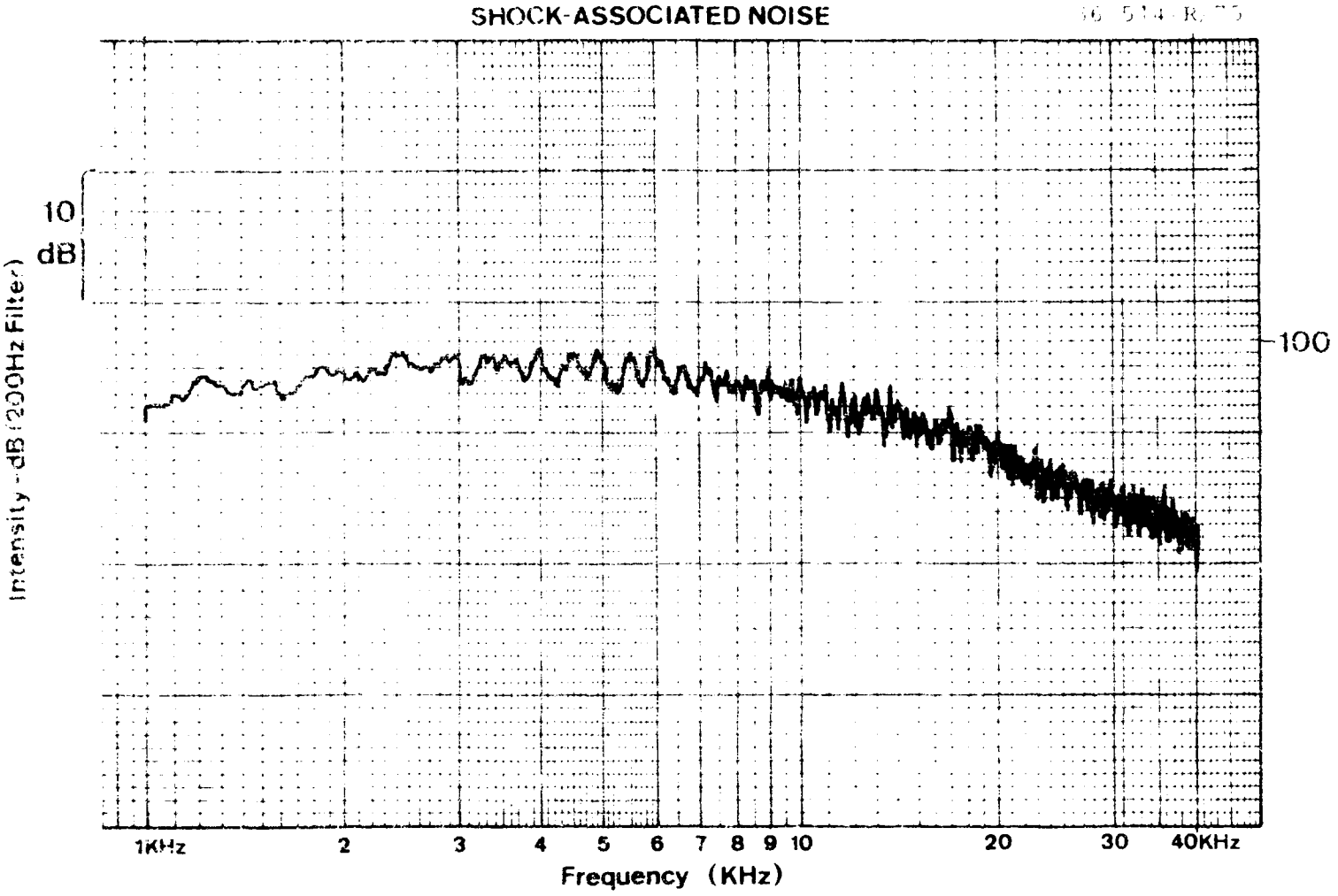
8
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
10
dB
Intensity - dB (200Hz Filter)
100
1KHz
2
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6
7
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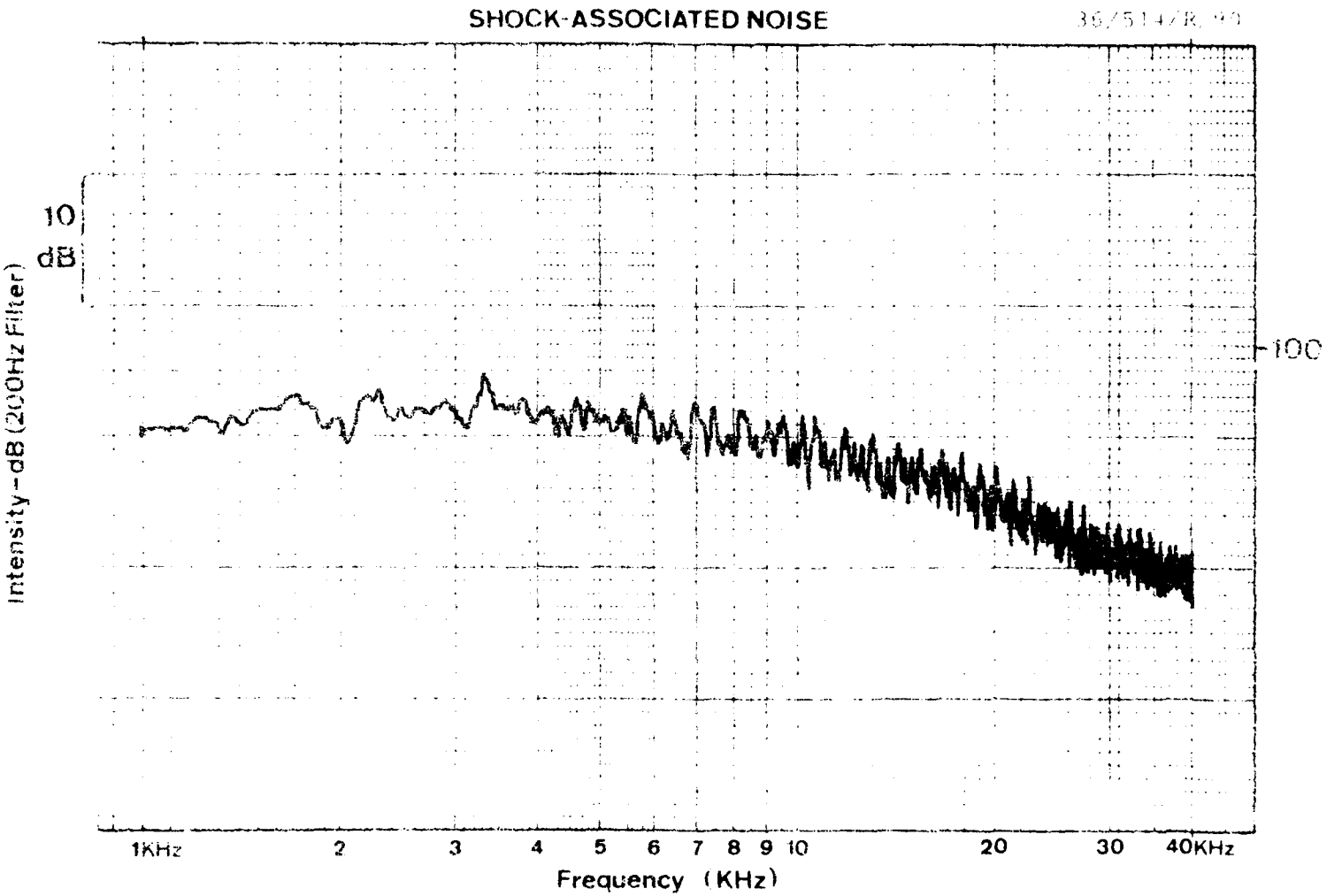
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
10
dB
Intensity - dB (200Hz Filter)
100
1KHz
2
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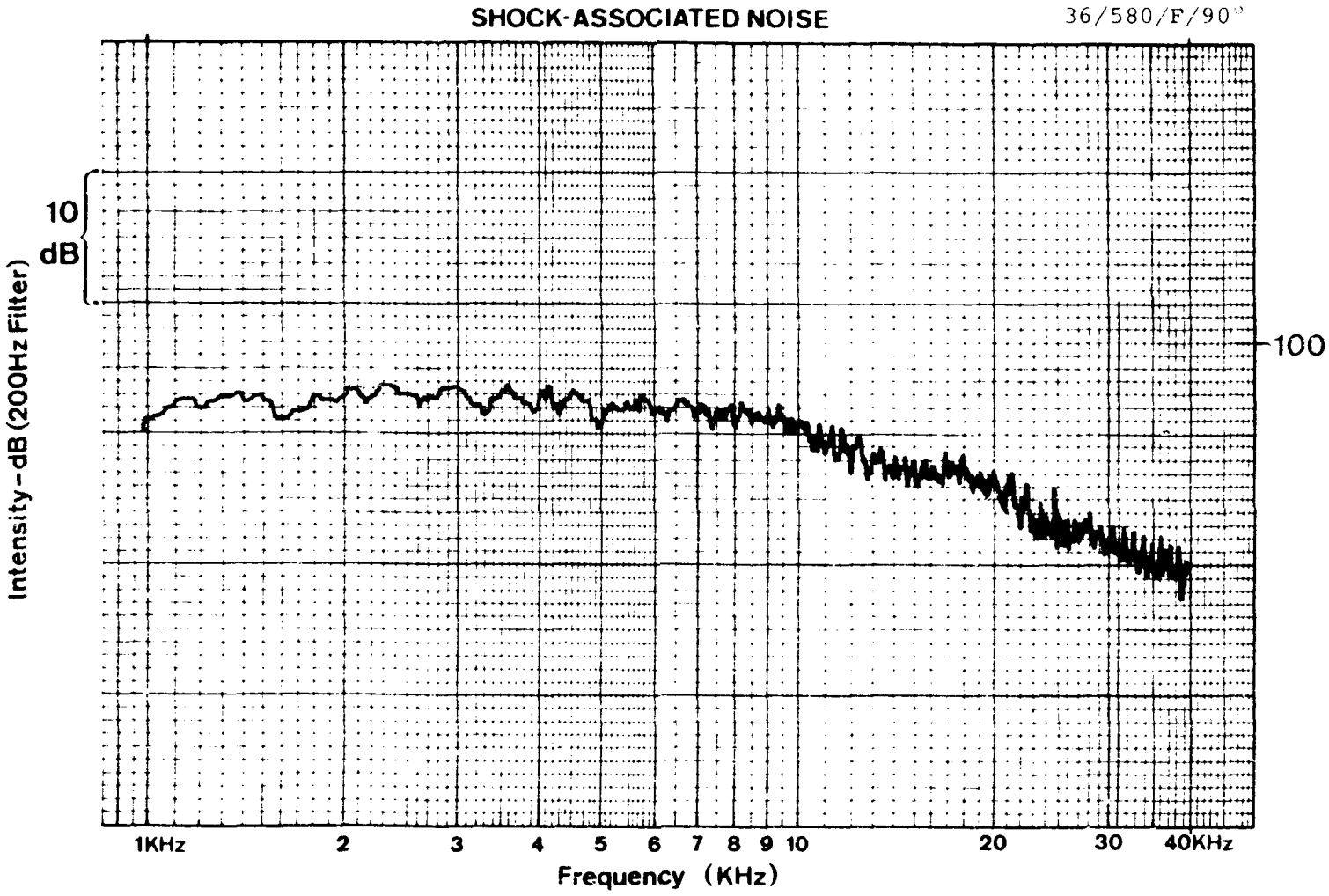
6
7
8
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
36/580/F/90
10
dB
Intensity-dB (200Hz Filter)
100
1KHz
2
3
4
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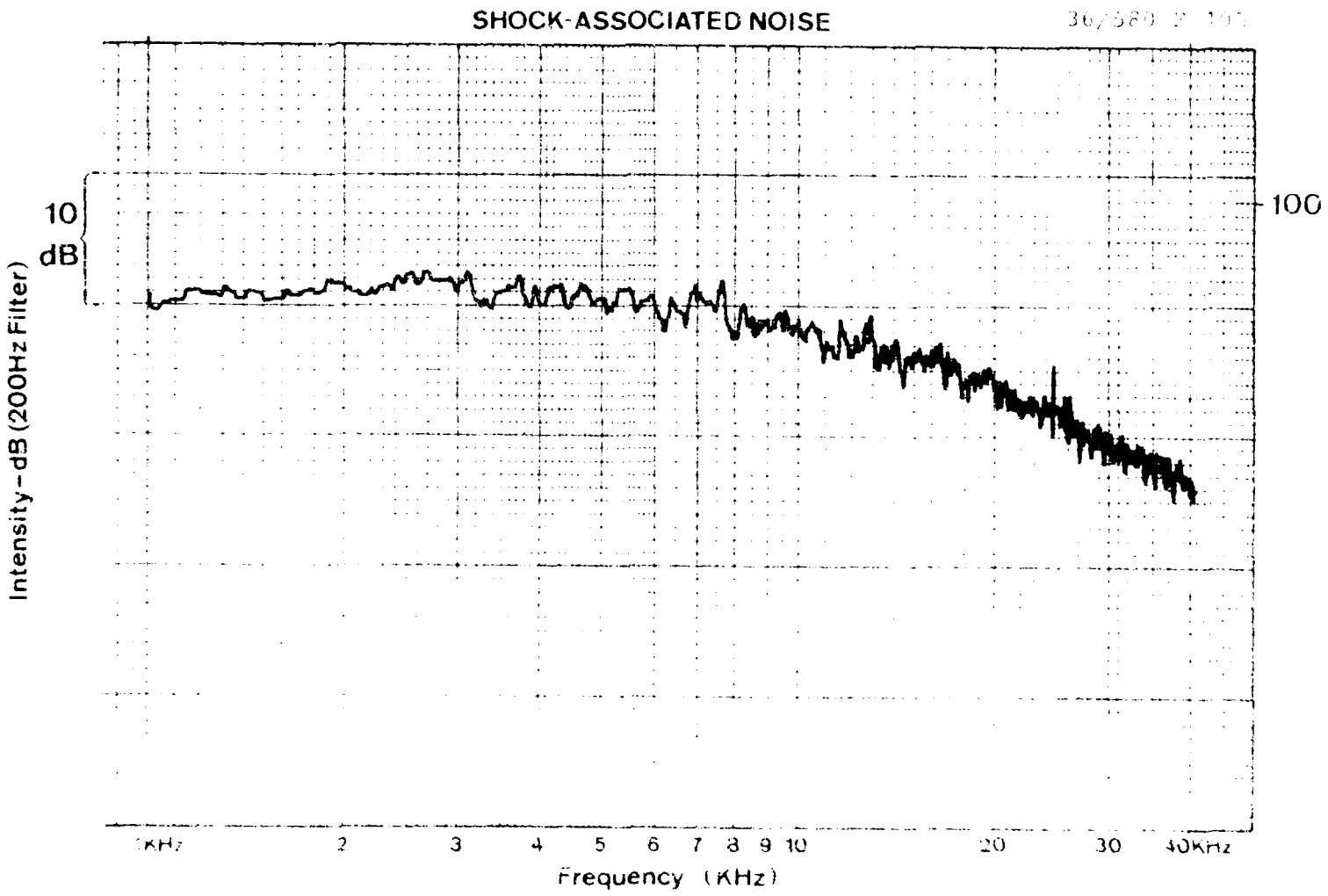
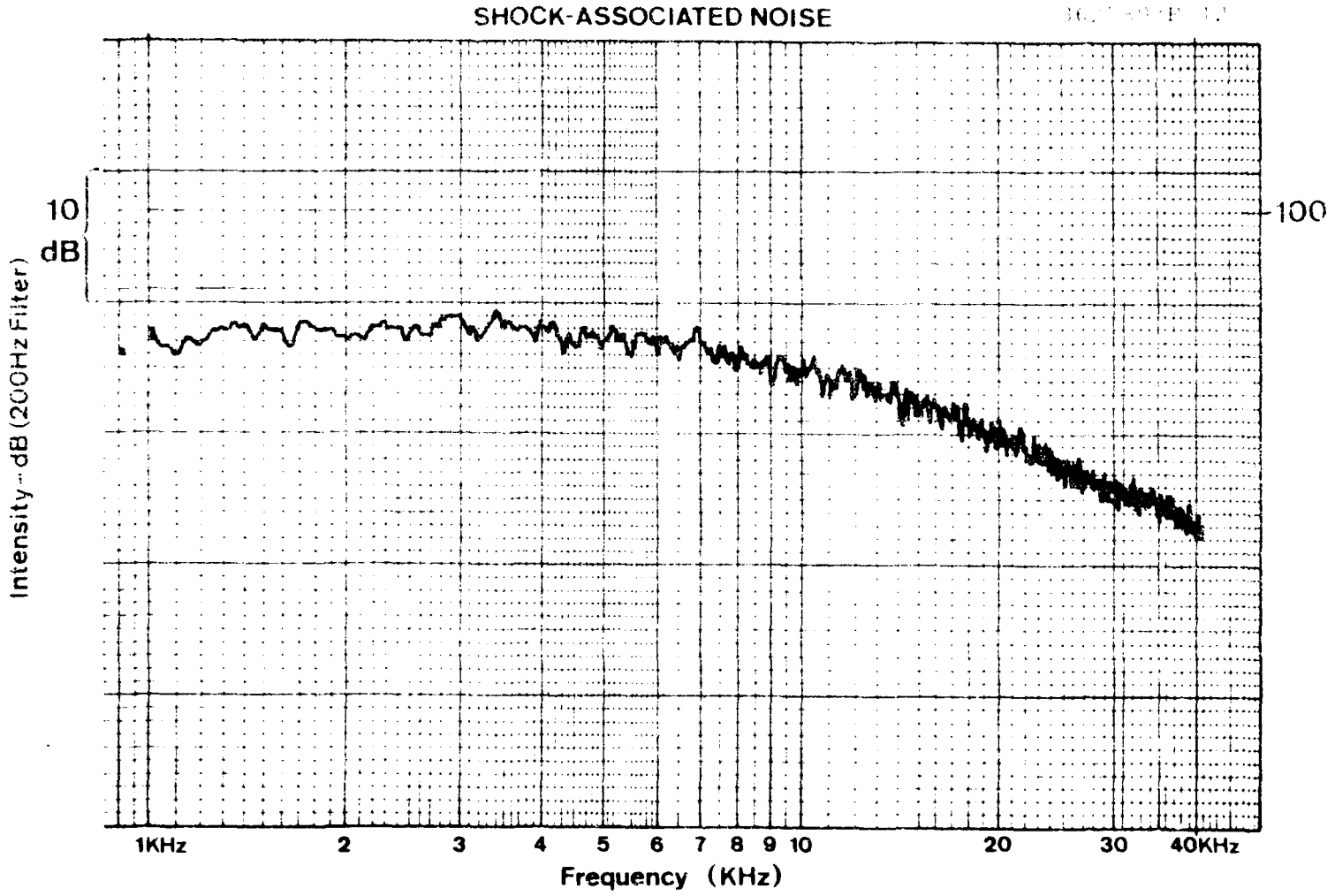
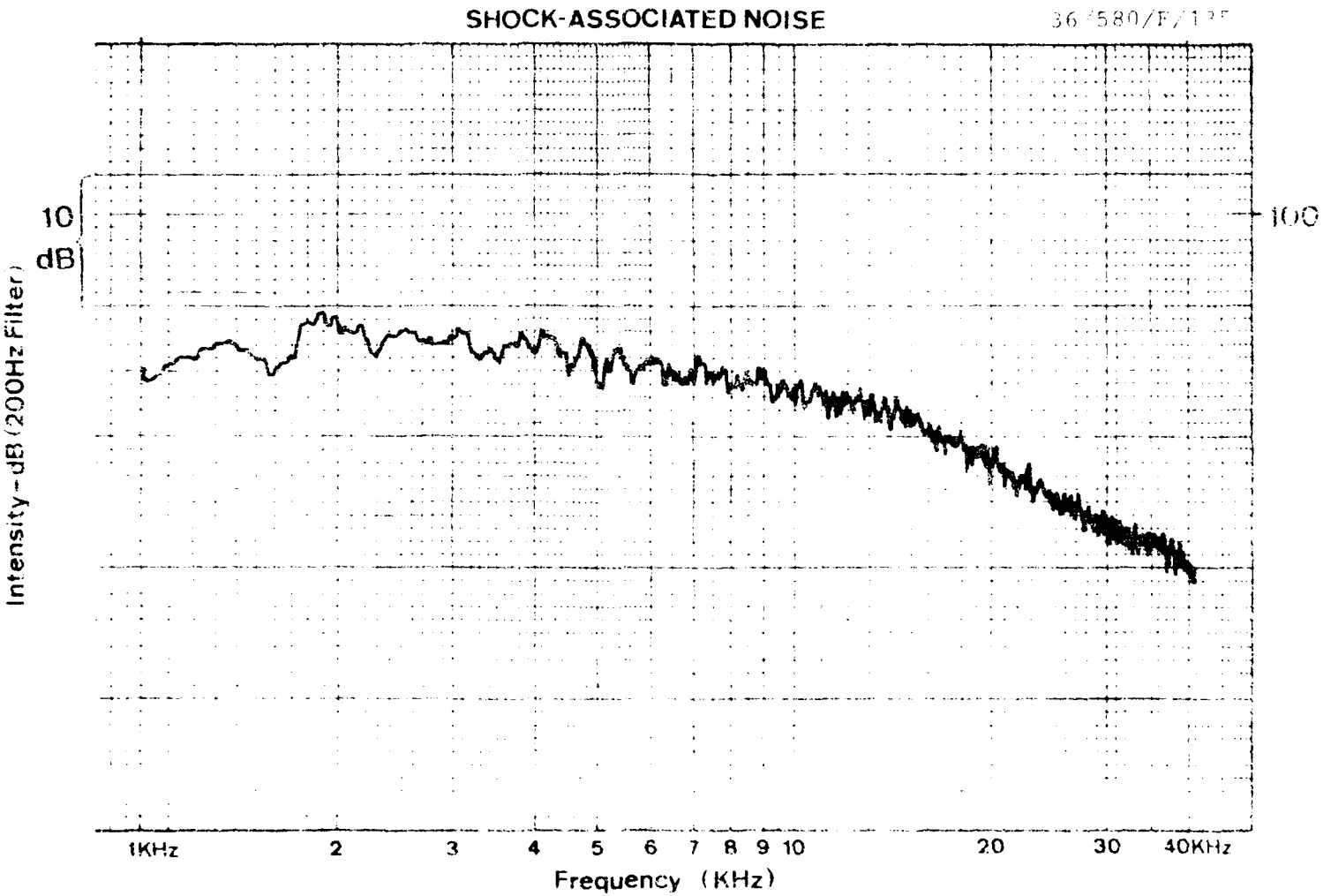
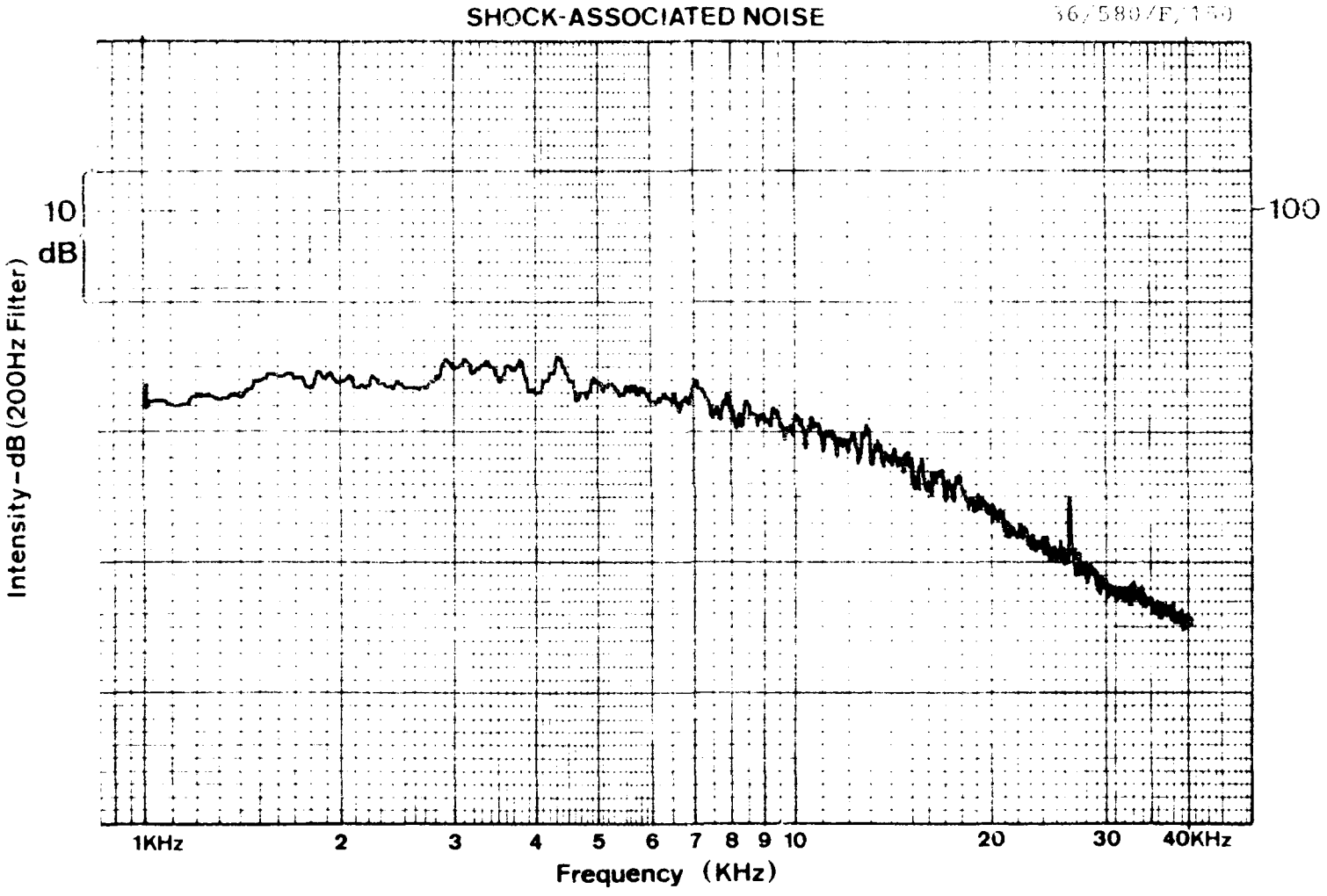
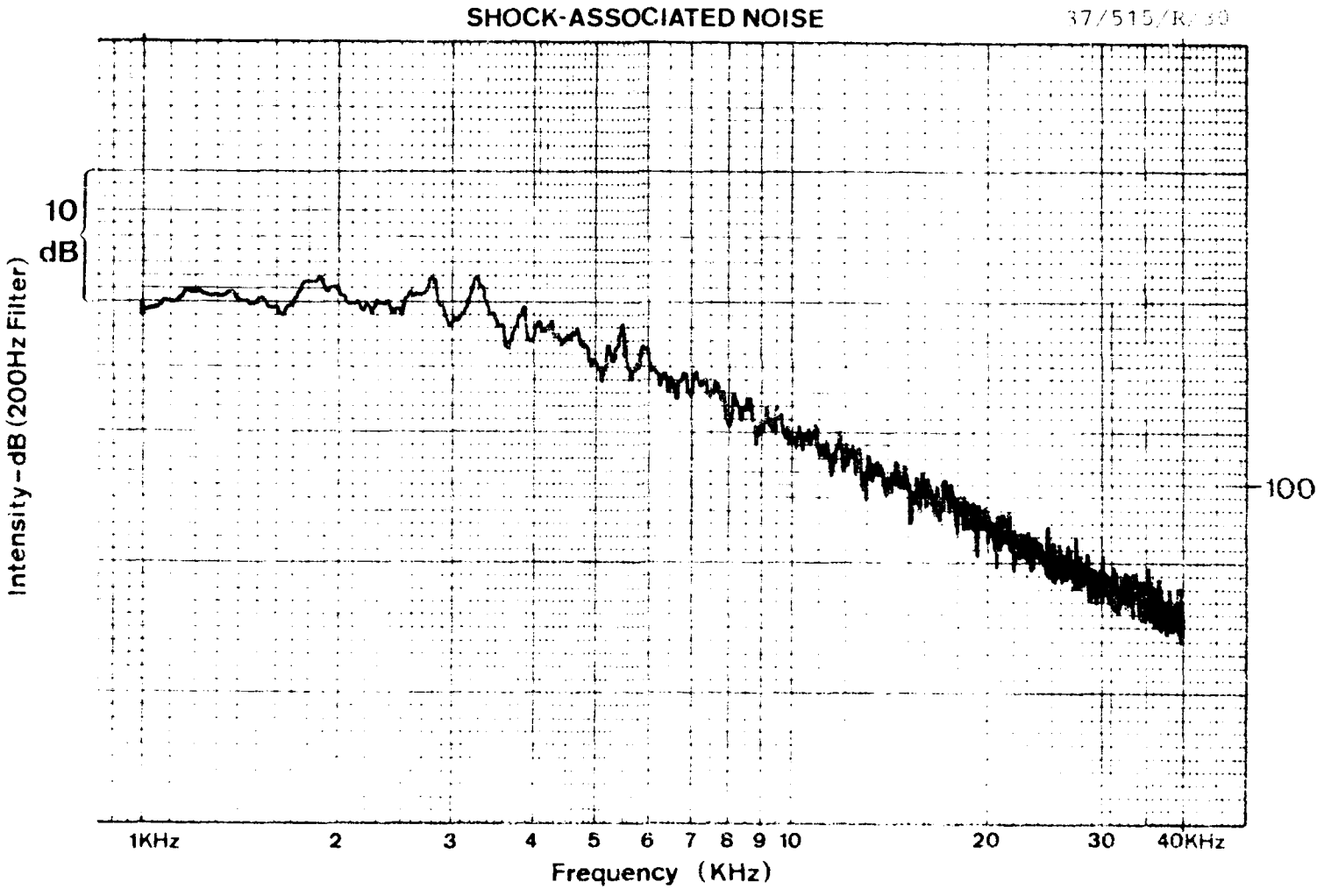
7
8
9
10
20
30
40KHz
Frequency (KHz)

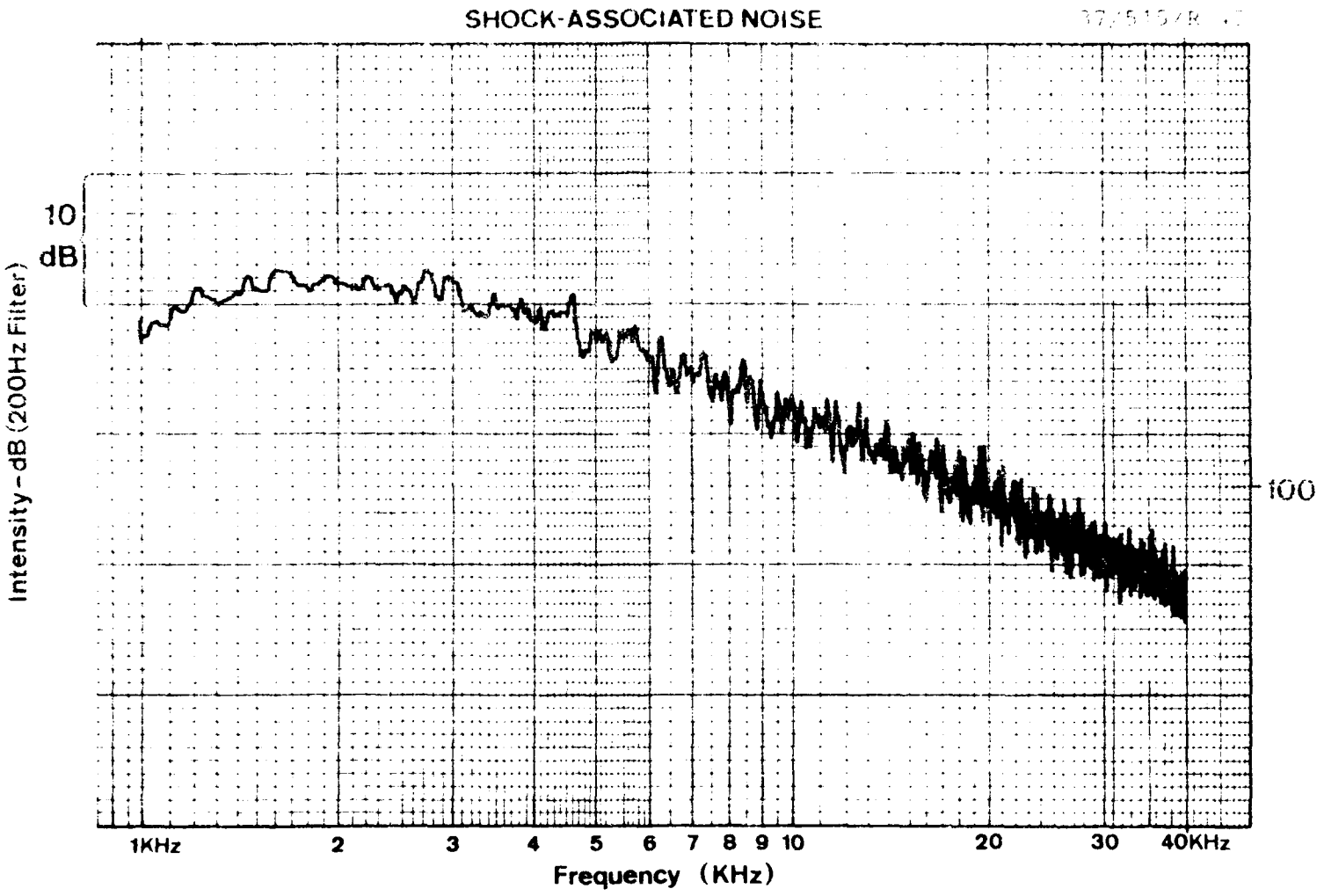

SHOCK-ASSOCIATED NOISE
10
dB
100
Intensity - dB (200Hz Filter)
2
3
4
5
6
7
8
9
10
20
30
40KHz
Frequency (KHz)

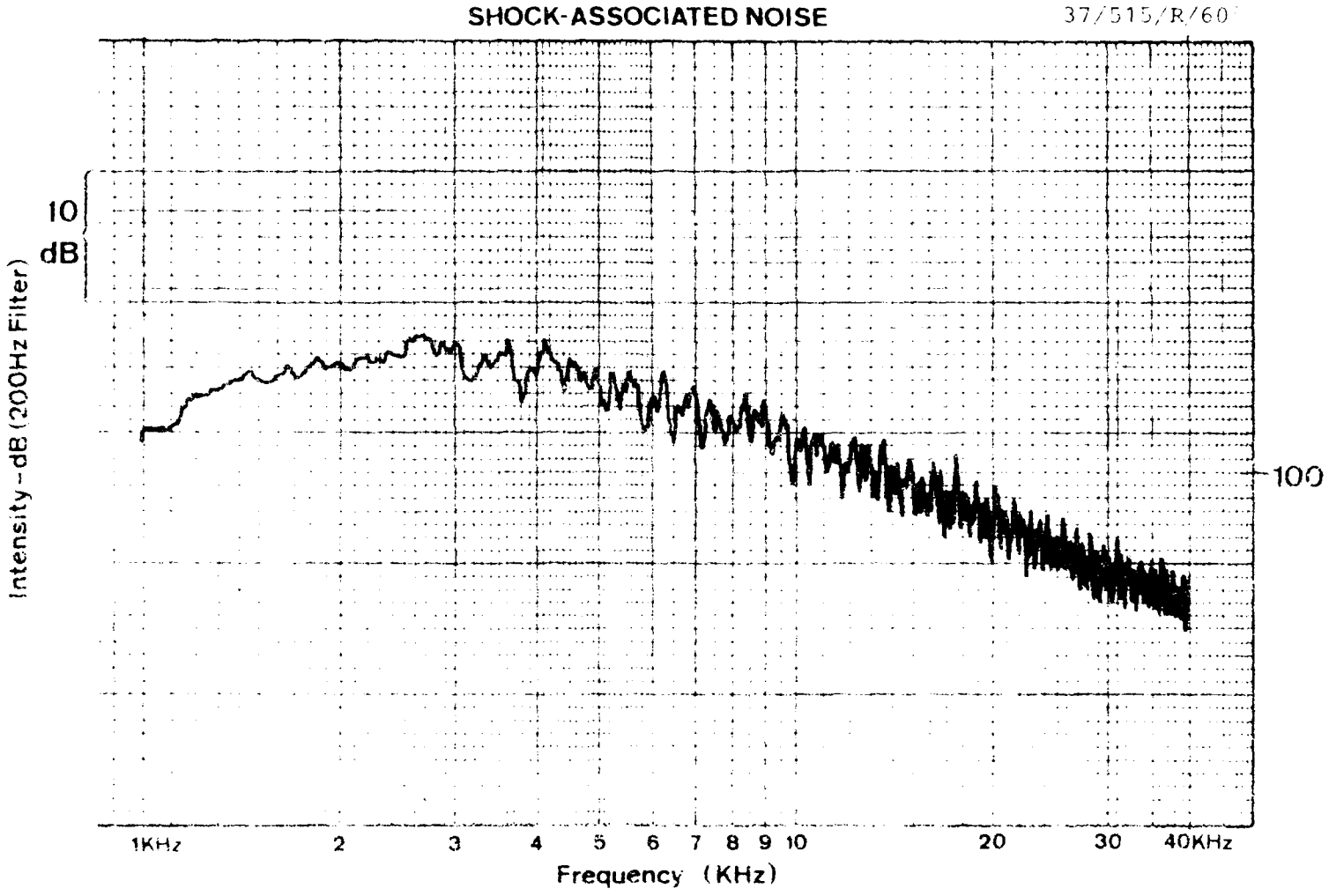

SHOCK-ASSOCIATED NOISE
10
dB
100
Intensity - dB (200Hz Filter)
1KHz
2
3
4
5
6
7
8
9
10
20
30
40KHz
Frequency (KHz)

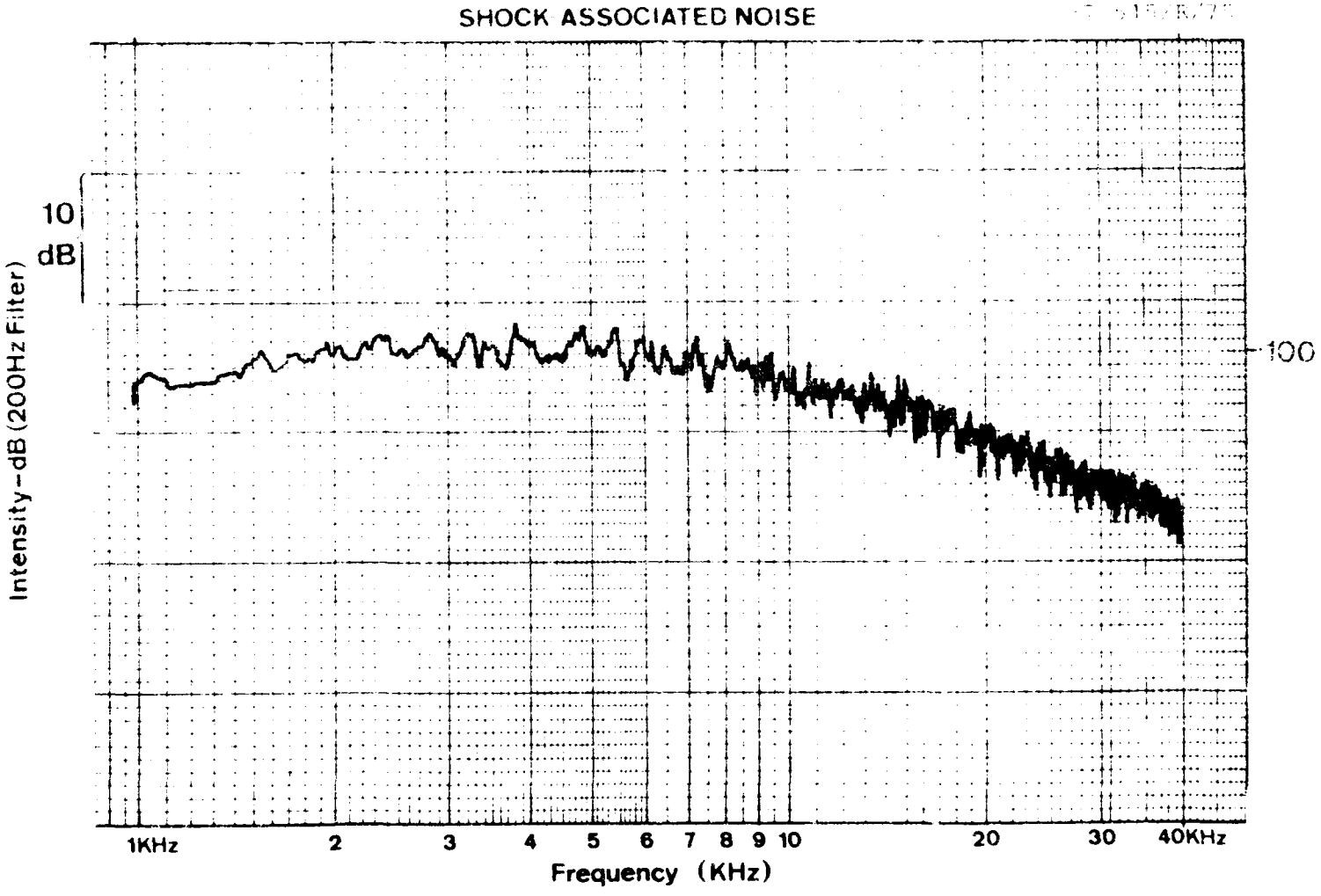

SHOCK-ASSOCIATED NOISE
10
dB
100
Intensity - dB (200Hz Filter)
1KHz
2
3
4
5
6
7
8
9
10
20
30
40KHz
Frequency (KHz)

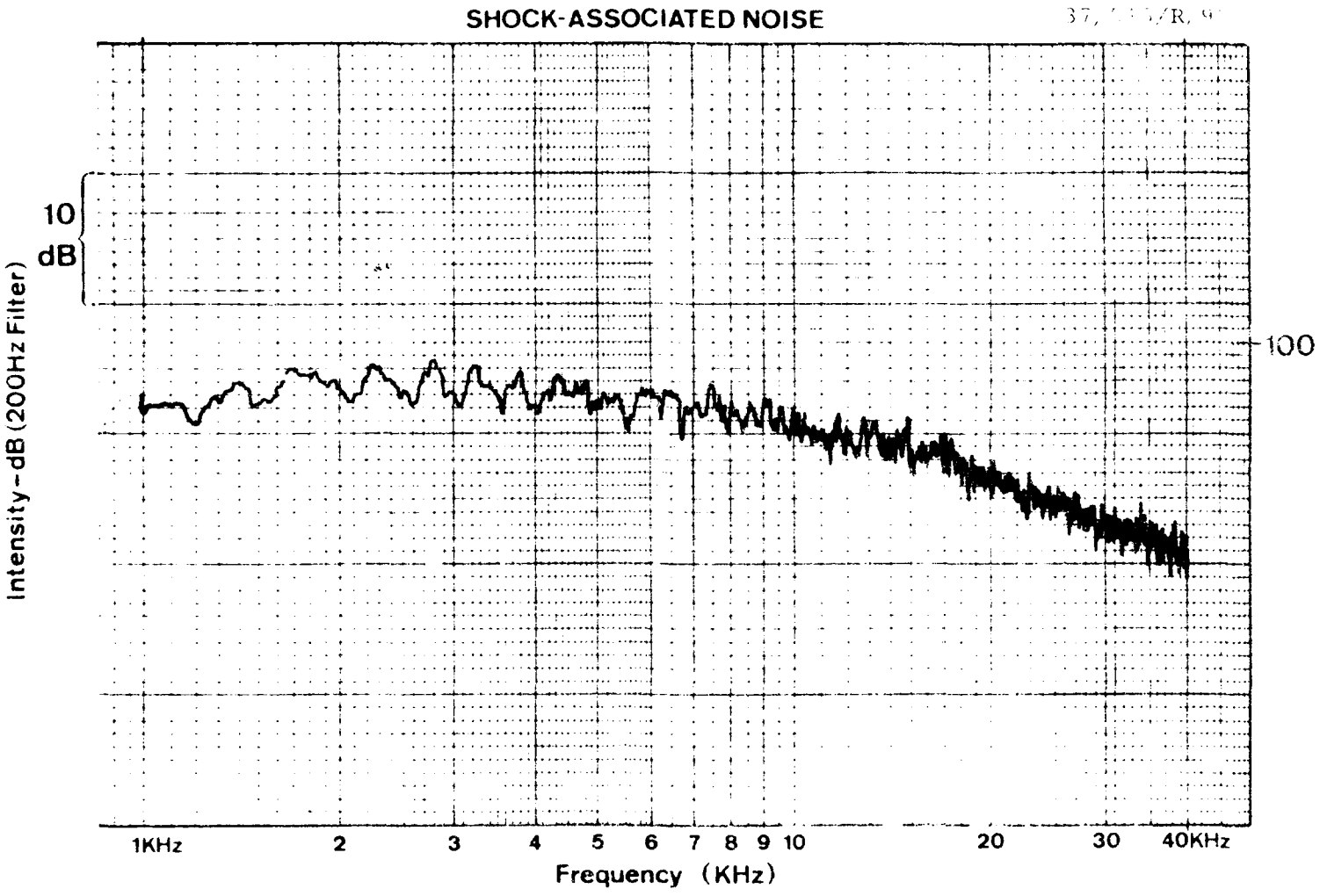

SHOCK-ASSOCIATED NOISE
36/580/F/150
10
dB
100
Intensity-dB (200Hz Filter)
1KHz
2
3
4
5
6
7
8
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
10
dB
Intensity - dB (200Hz Filter)
100
1KHz
2
3
4
5
6
7
8
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
10
dB
Intensity - dB (200Hz Filter)
100
1KHz
2
3
4
5
6
7
8
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
37/515/R/60
10
dB
Intensity - dB (200Hz Filter)
100
1KHz
2
3
4
5
6
7
8
9
10
20
30
40KHz
Frequency (KHz)


SHOCK ASSOCIATED NOISE
10
dB
Intensity-dB (200Hz Filter)
100
1KHz
2
3
4
5
6
7
8
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
10
dB
Intensity-dB (200Hz Filter)
100
1KHz
2
3
4
5
6
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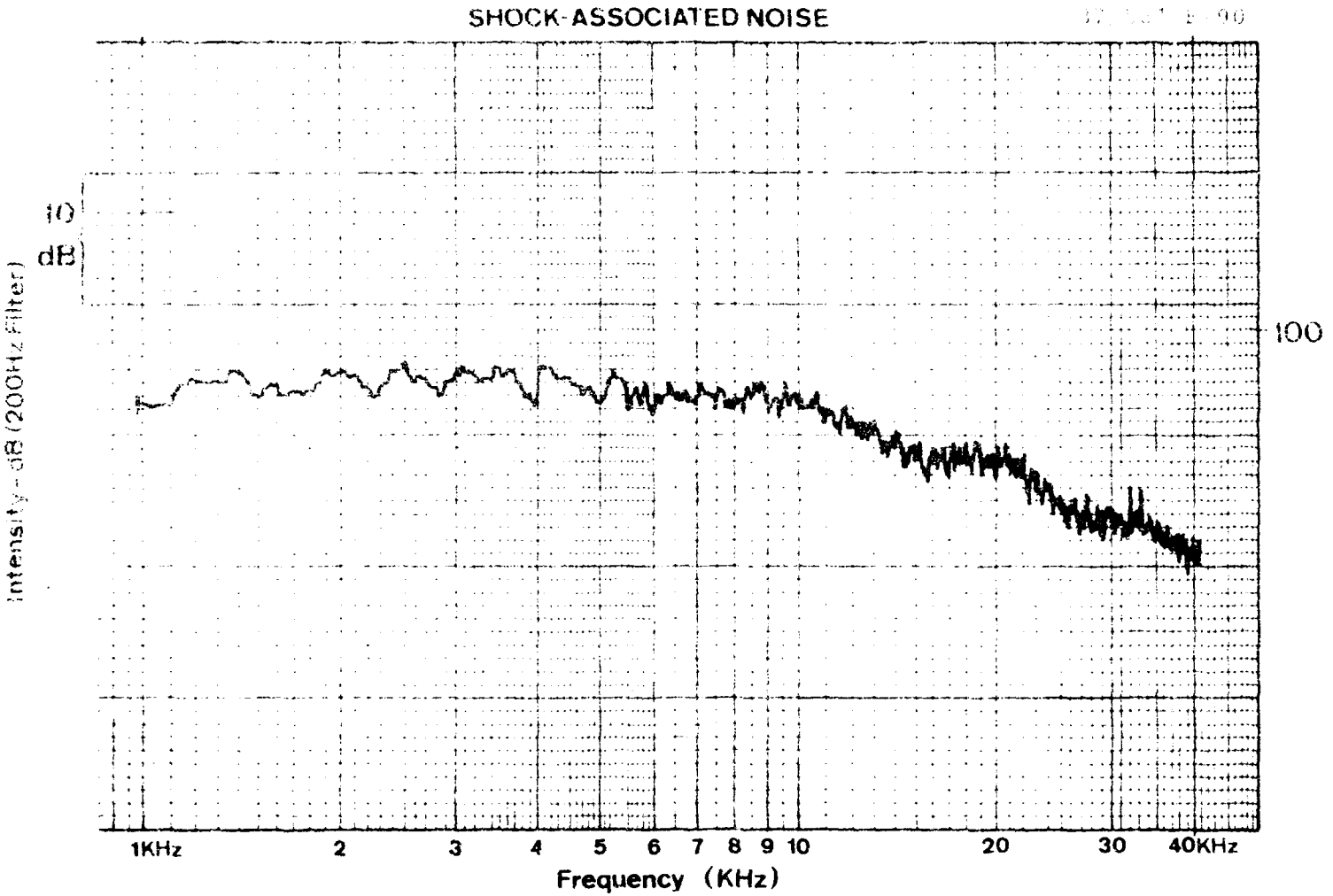
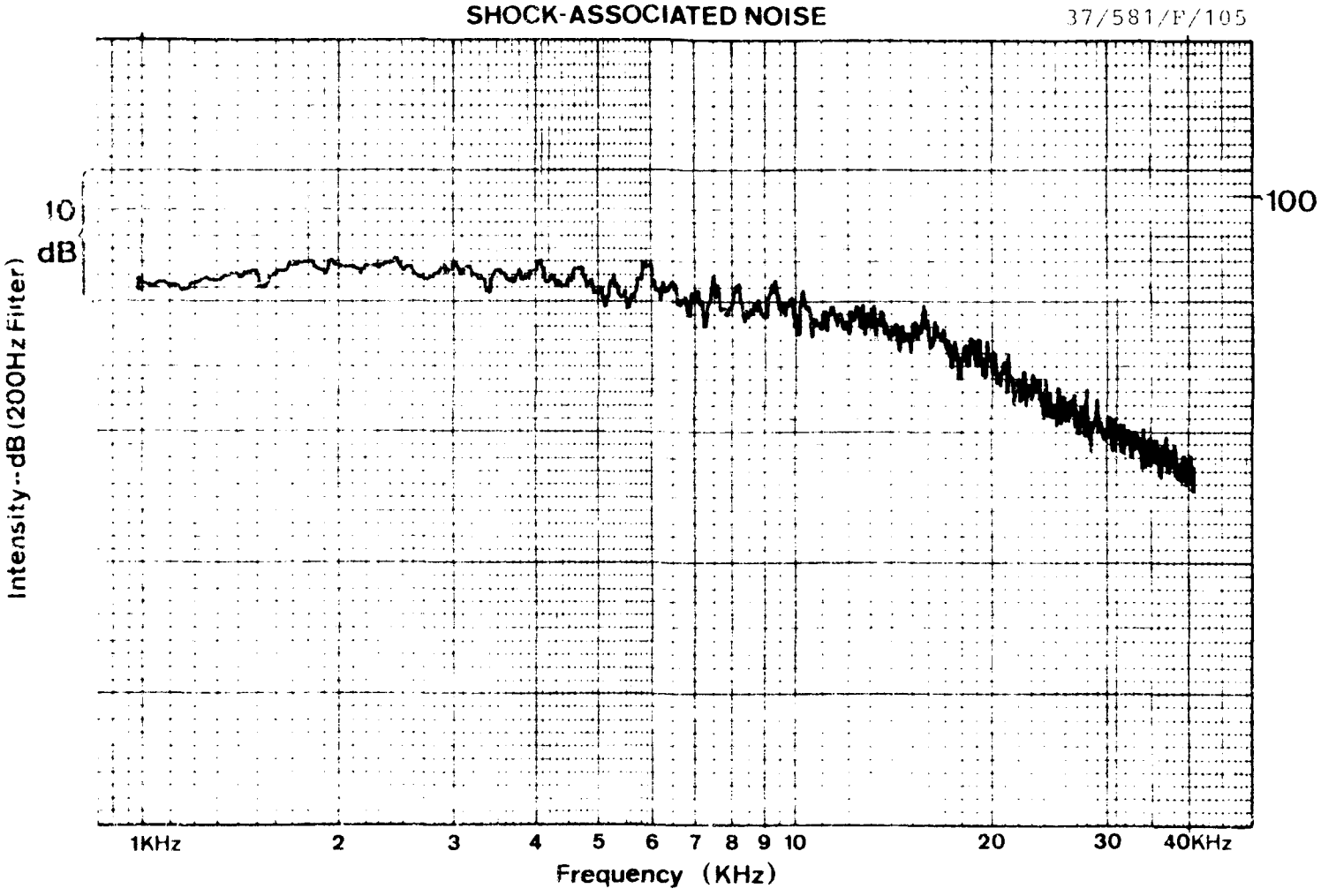
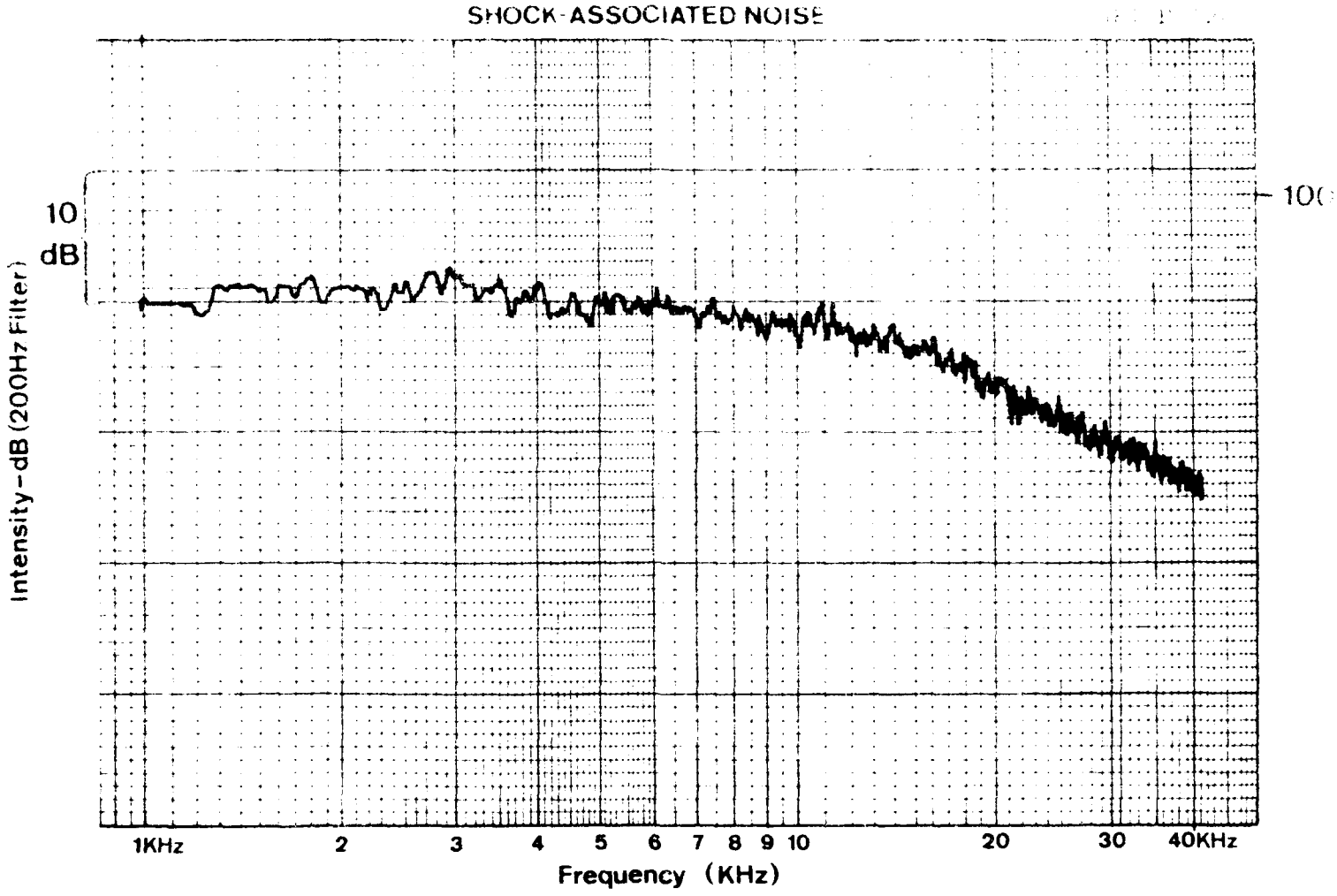
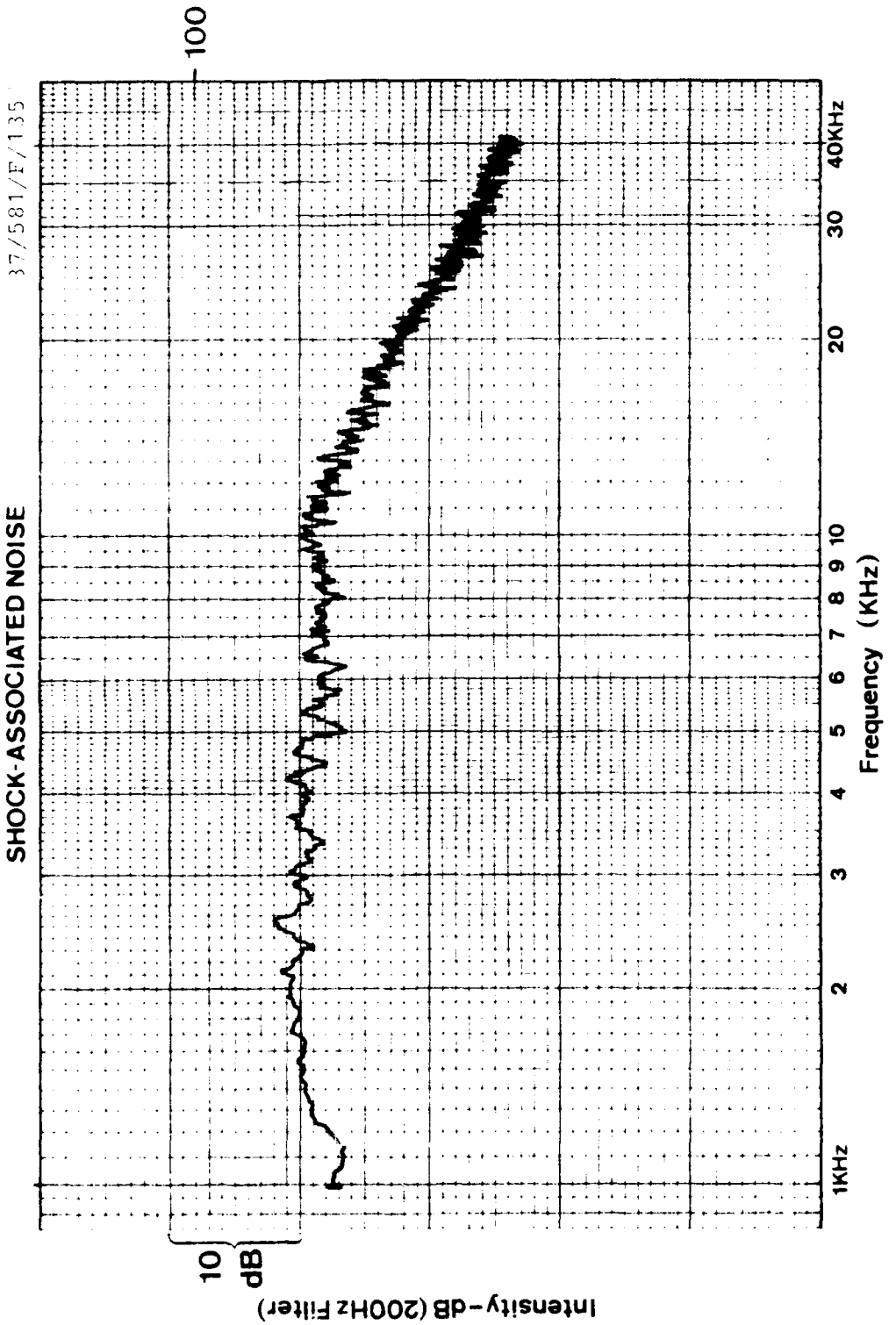
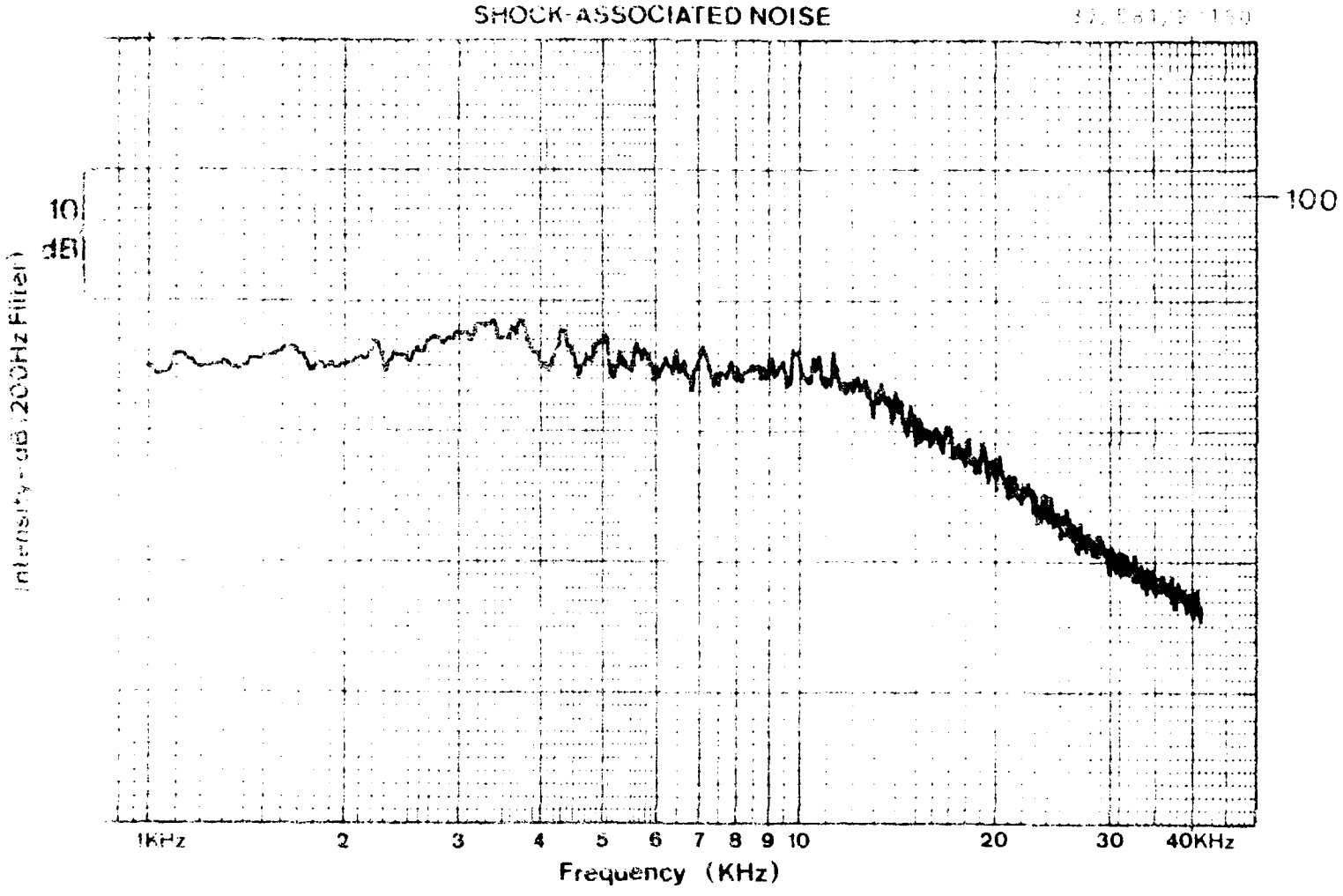
8
9
10
20
30
40KHz
Frequency (KHz)

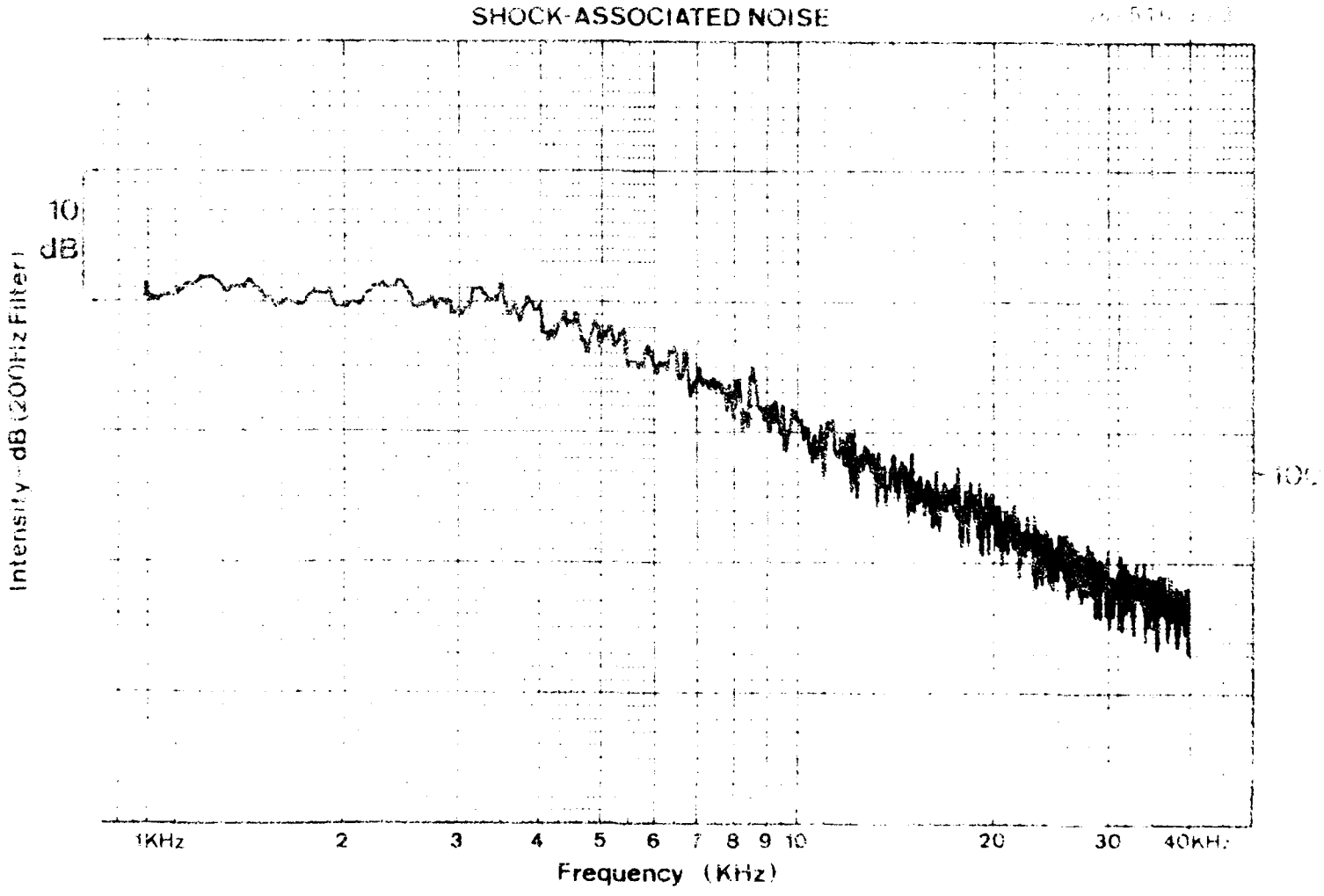

SHOCK-ASSOCIATED NOISE
10
dB
100
1KHz
2
3
4
5
6
7
8
9
10
20
30
40KHz
Frequency (KHz)

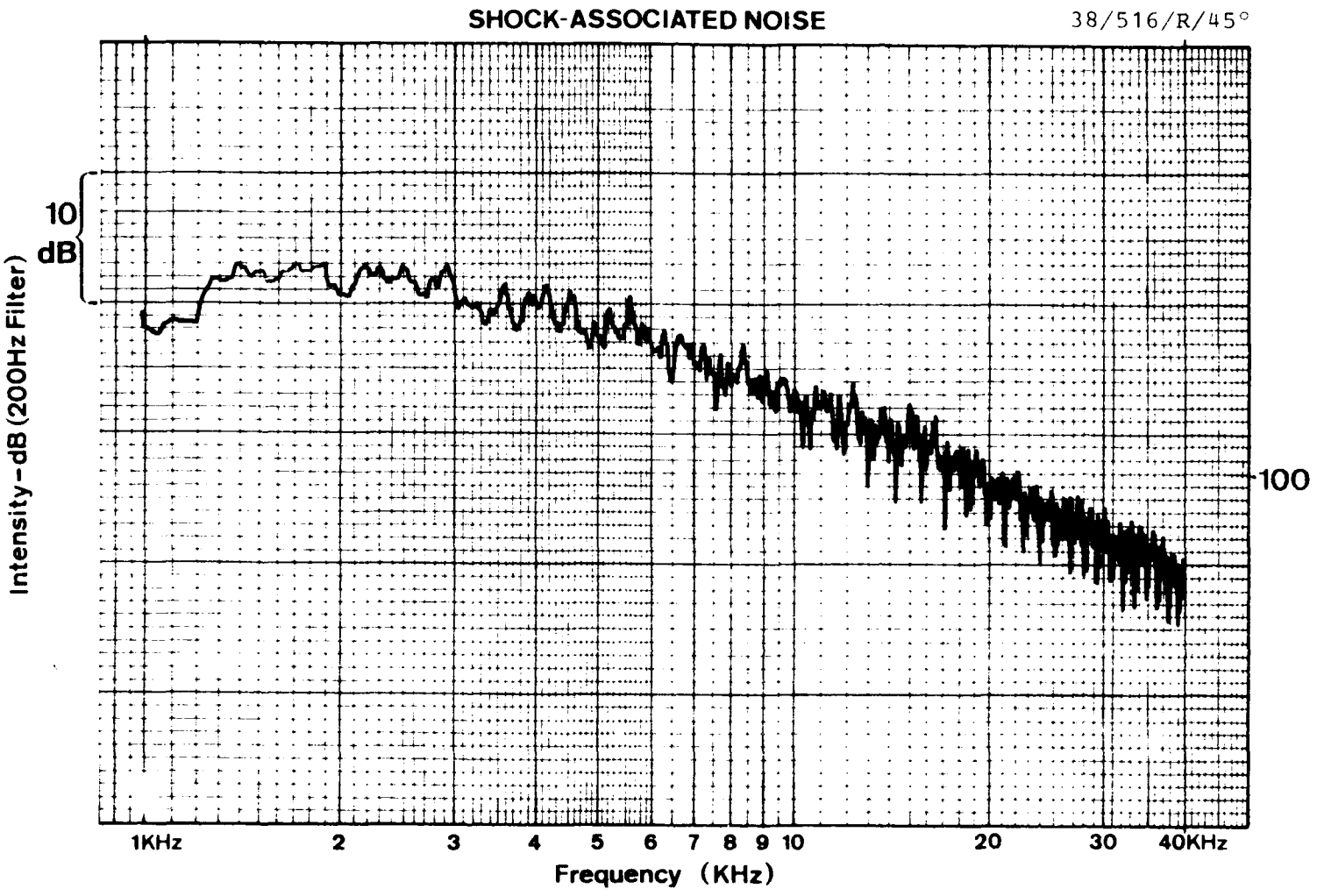

SHOCK-ASSOCIATED NOISE
37/581/F/105
10 dB
100
Intensity--dB (200Hz Filter)
1KHz
2
3
4
5
6
7
8
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
10
dB
100
Intensity-dB (200Hz Filter)
1KHz
2
3
4
5
6
7
8
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
37/581/F/135
100
10 dB
Intensity – dB (200Hz Filter)
1KHz
2
3
4
5
6
7
8
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
10
dB
100
1KHz
2
3
4
5
6
7
8
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
10
dB
Intensity - dB (200Hz Filter)
1KHz
2
3
4
5
6
7
8
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
38/516/R/45°
10
dB
Intensity-dB (200Hz Filter)
100
1KHz
2
3
4
5
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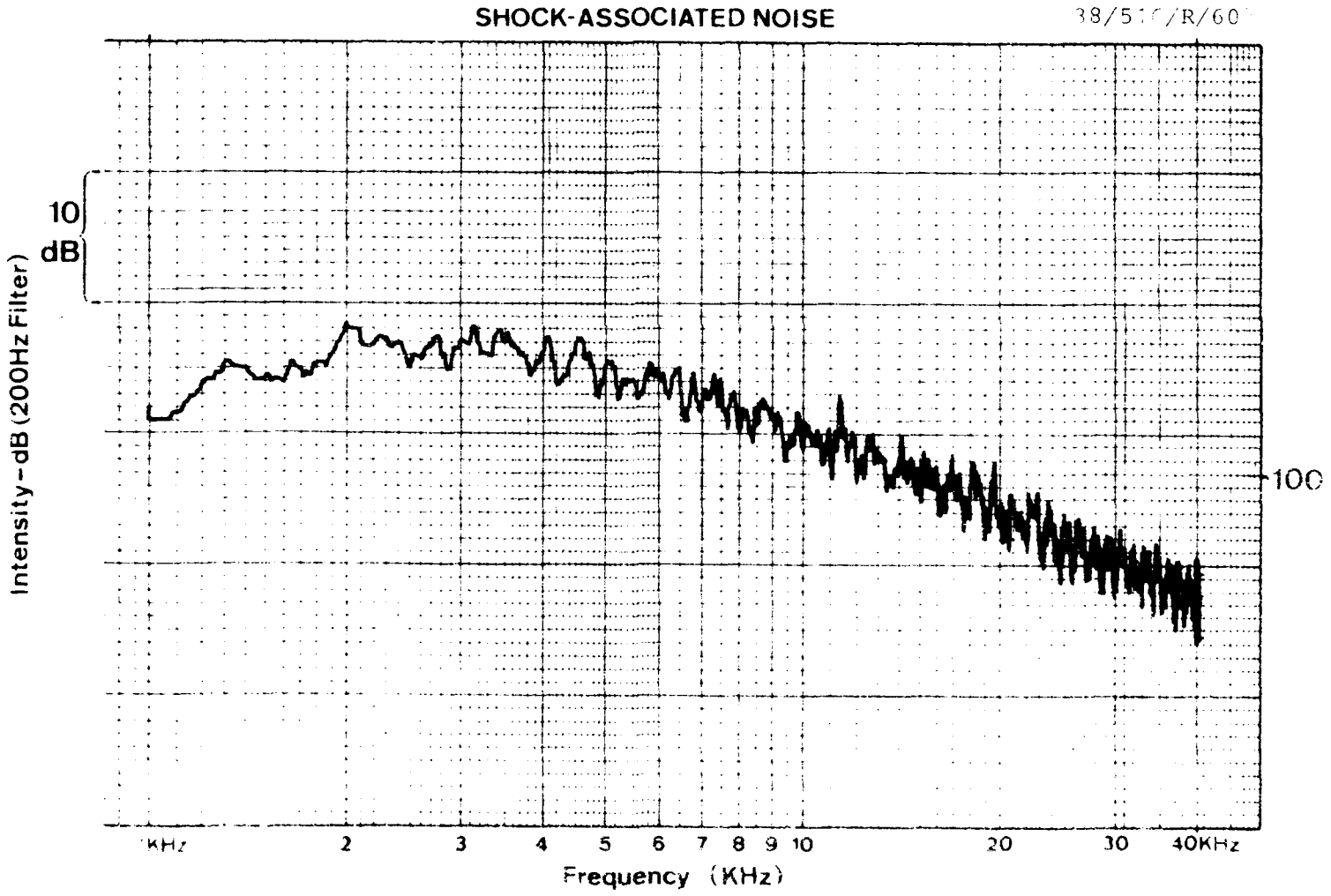
8
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
38/51C/R/60
10
dB
Intensity - dB (200Hz Filter)
100
KHz
2
3
4
5
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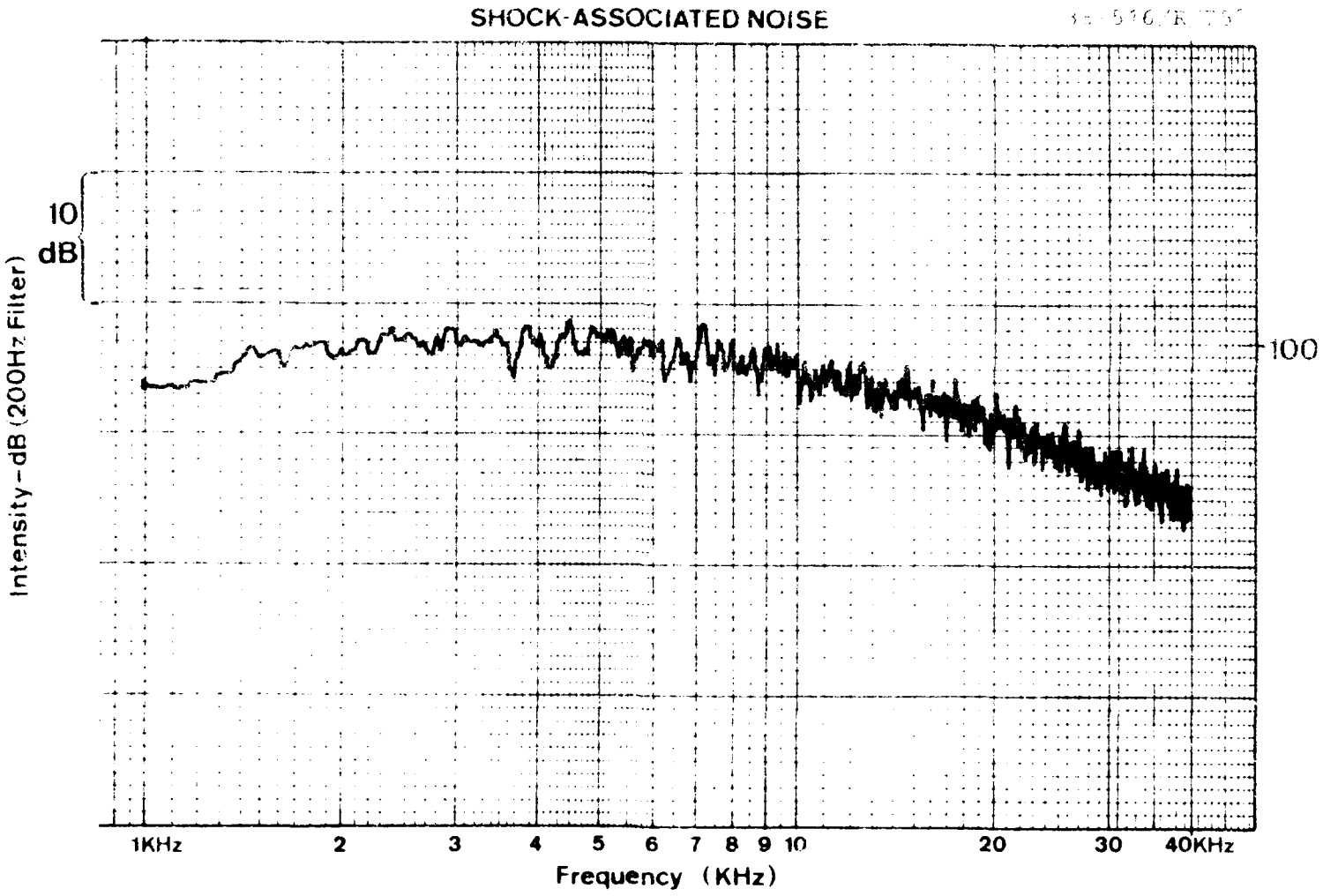
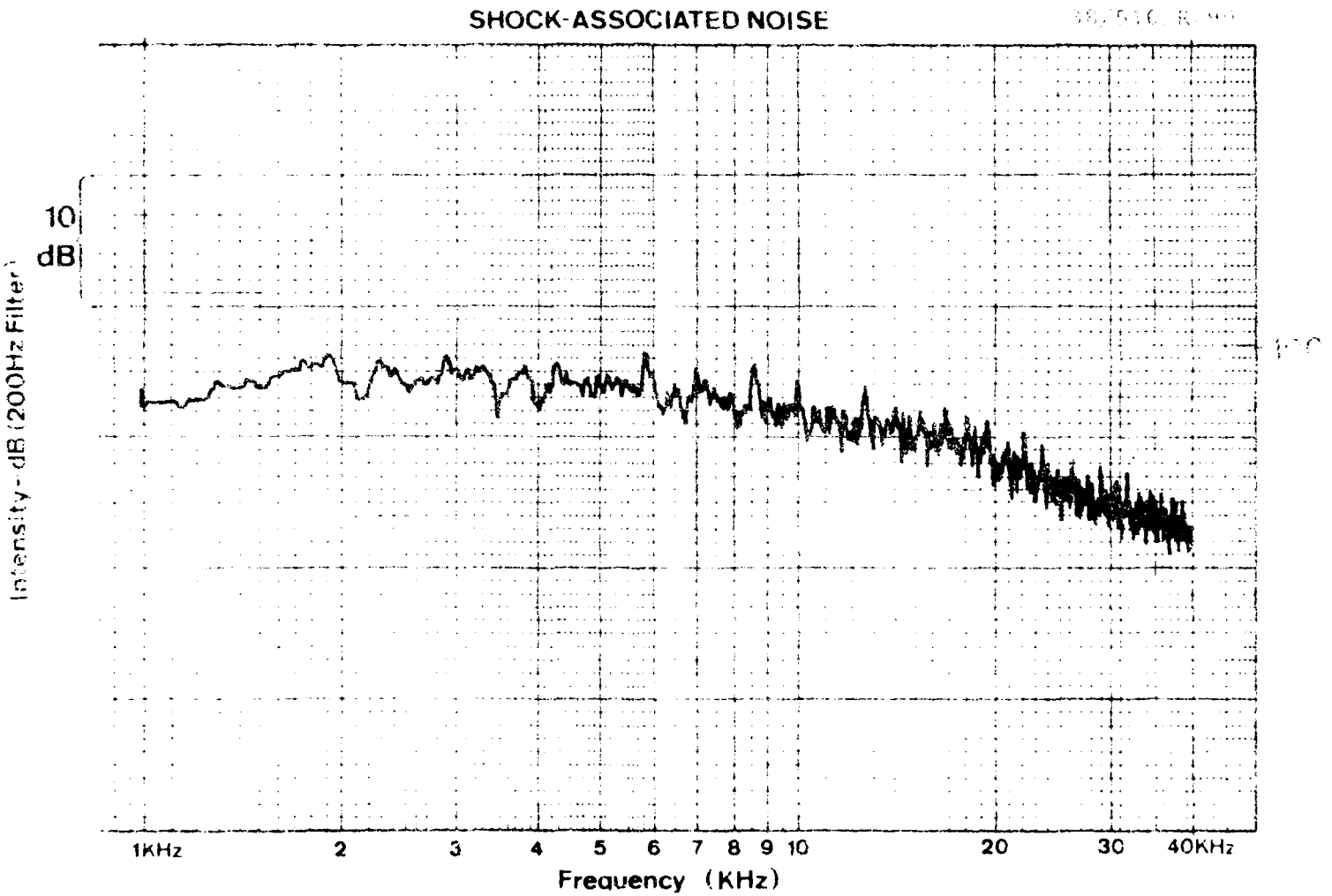
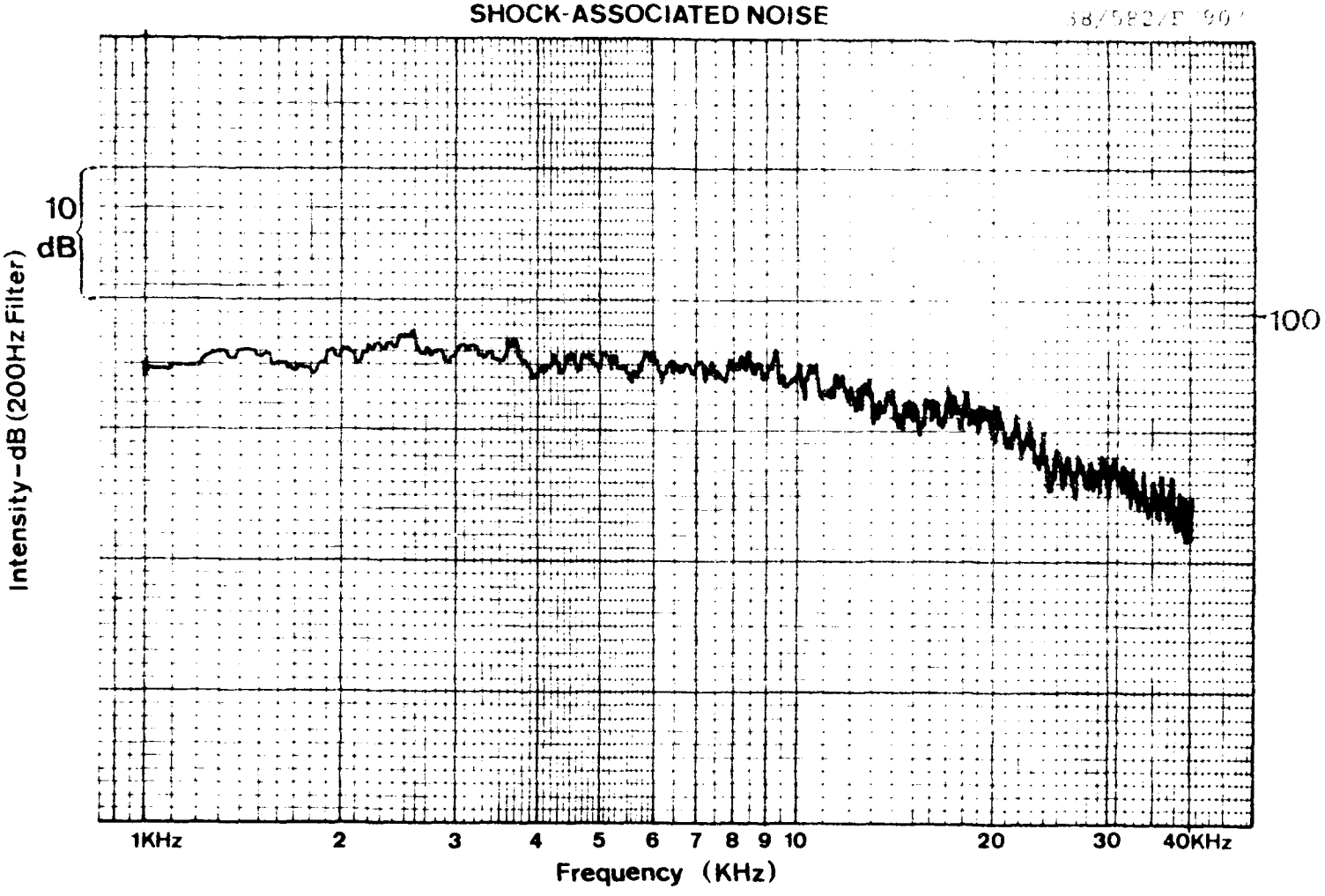
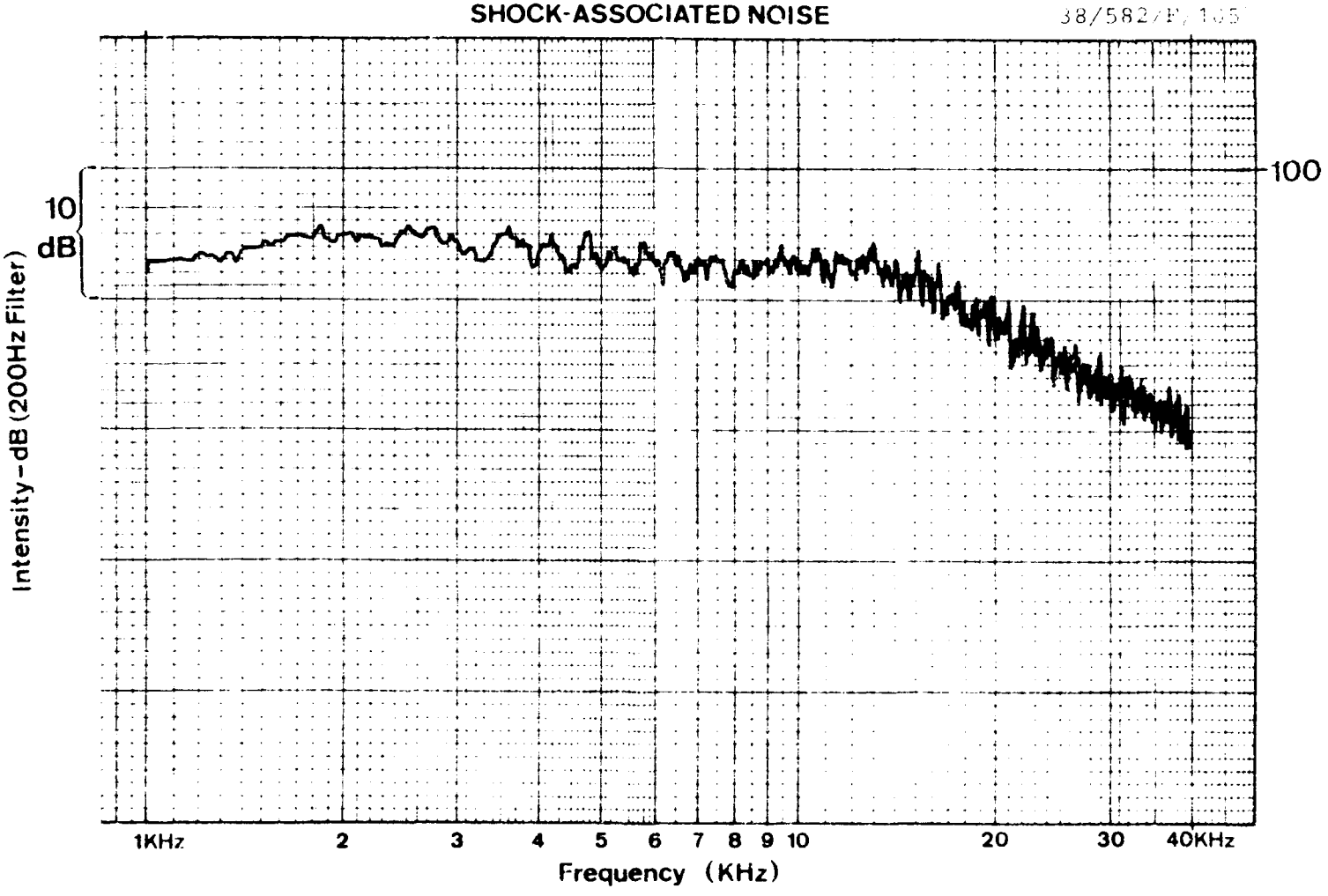
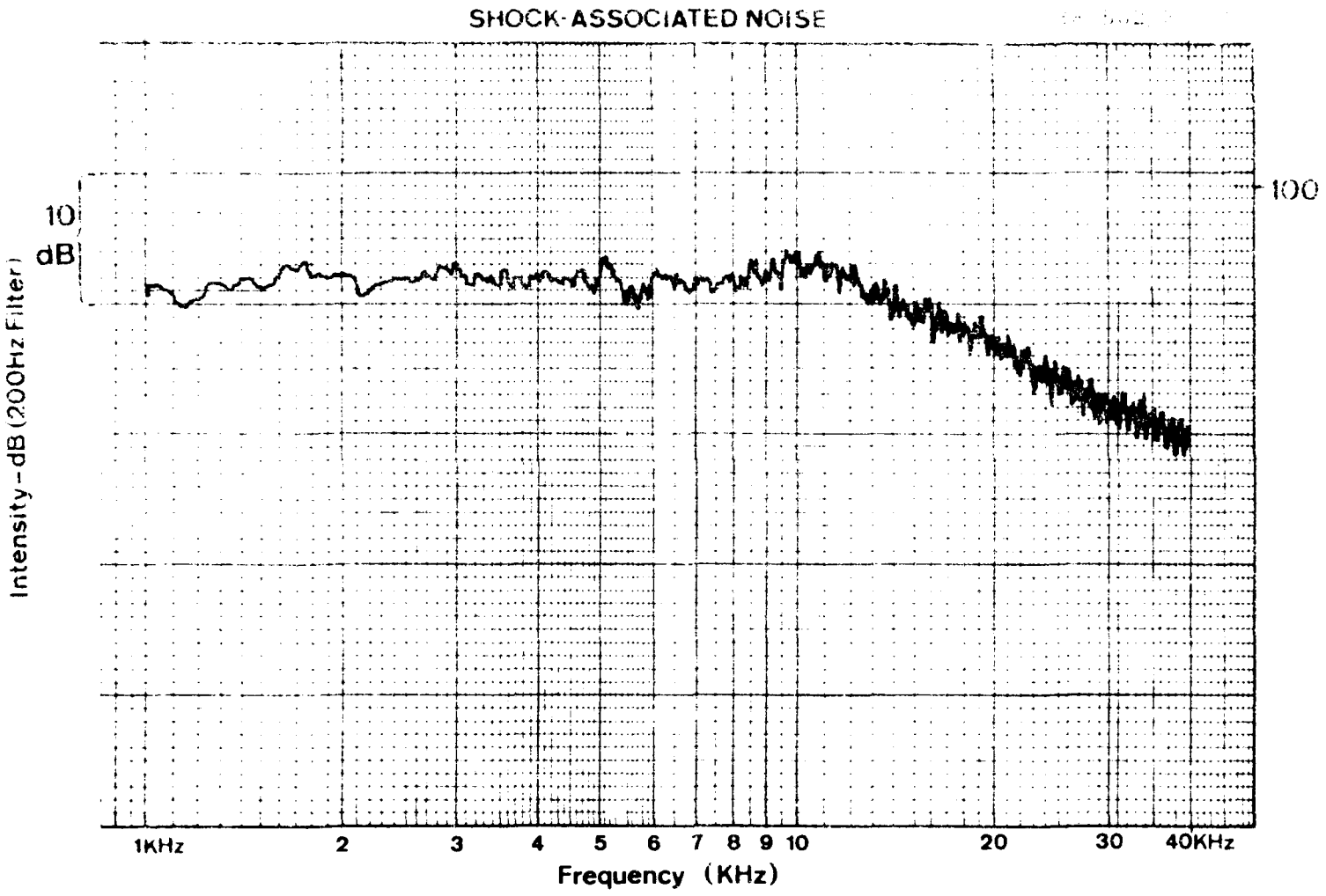
7
8
9
10
20
30
40KHz
Frequency (KHz)

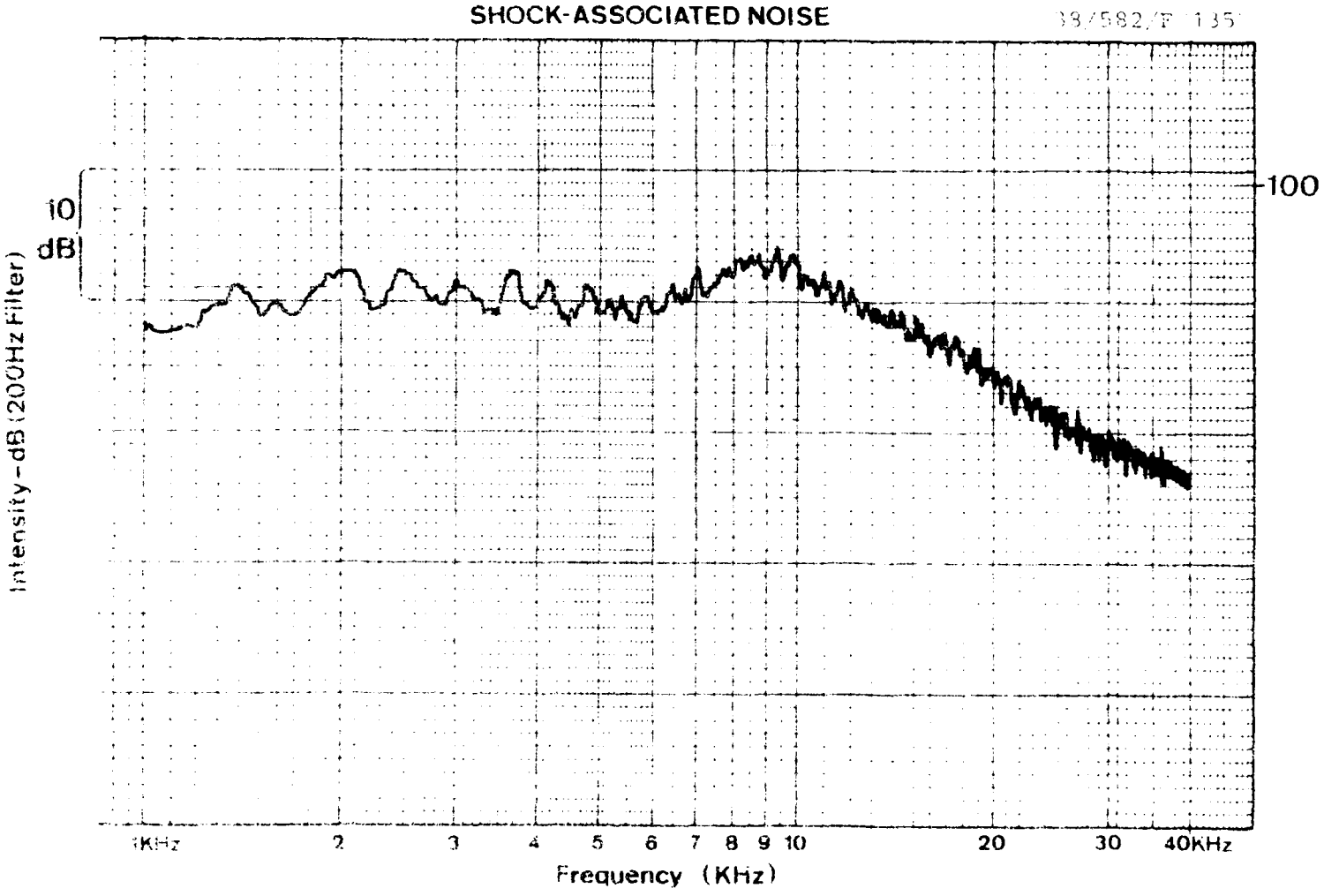

SHOCK-ASSOCIATED NOISE
10
dB
Intensity - dB (200Hz Filter)
100
1KHz
2
3
4
5
6
7
8
9
10
20
30
40KHz
Frequency (KHz)

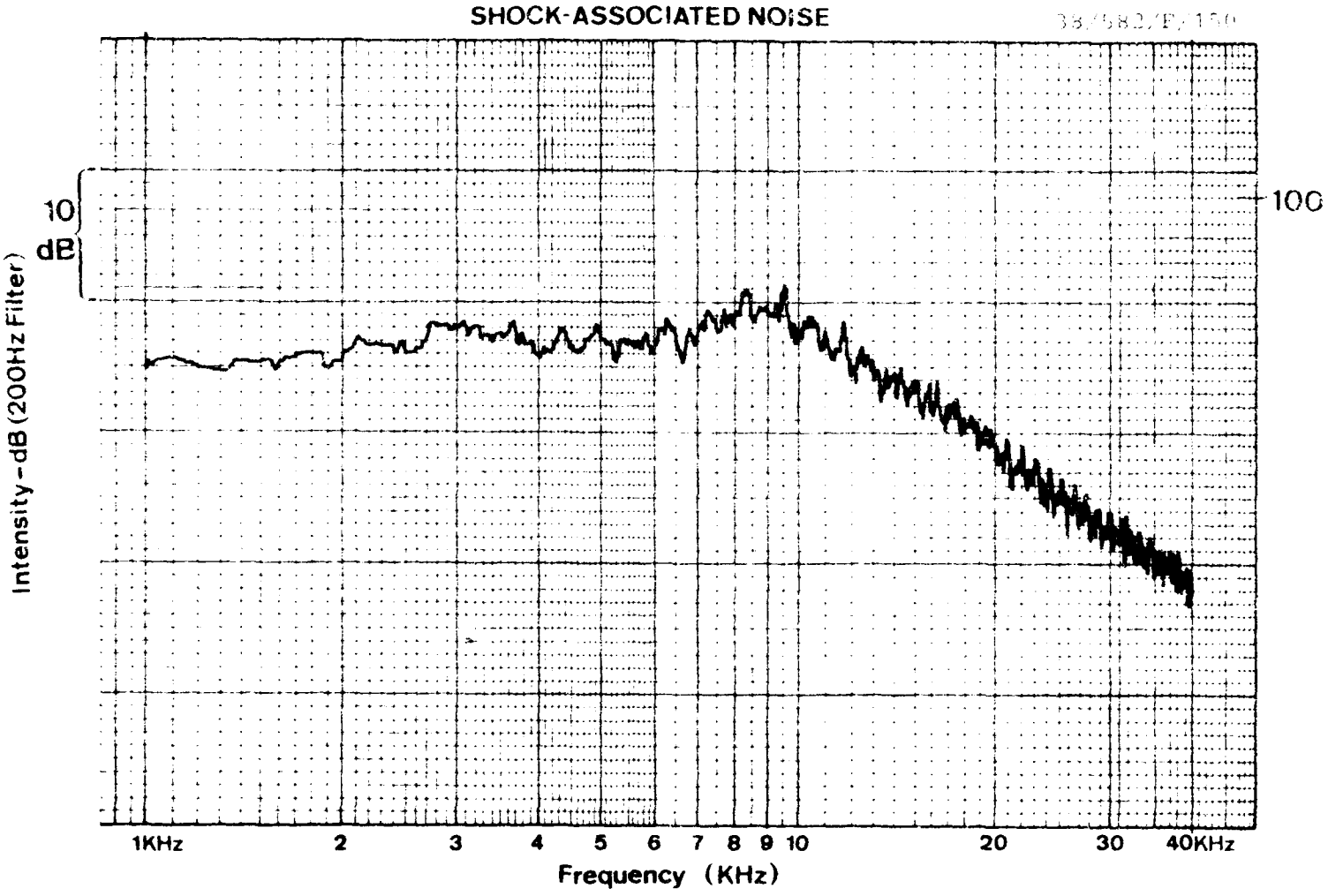

SHOCK-ASSOCIATED NOISE
10
dB
Intensity - dB (200Hz Filter)
1KHz
2
3
4
5
6
7
8
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
10
dB
Intensity-dB (200Hz Filter)
100
1KHz
2
3
4
5
6
7
8
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
38/582/P
100
10
dB
Intensity-dB (200Hz Filter)
1KHz
2
3
4
5
6
7
8
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
10 dB
100
Intensity - dB (200Hz Filter)
1KHz
2
3
4
5
6
7
8
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
10
dB
100
Intensity - dB (200Hz Filter)
1KHz
2
3
4
5
6
7
8
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOiSE
38/582/F/150
10
dB
100
Intensity - dB (200Hz Filter)
1KHz
2
3
4
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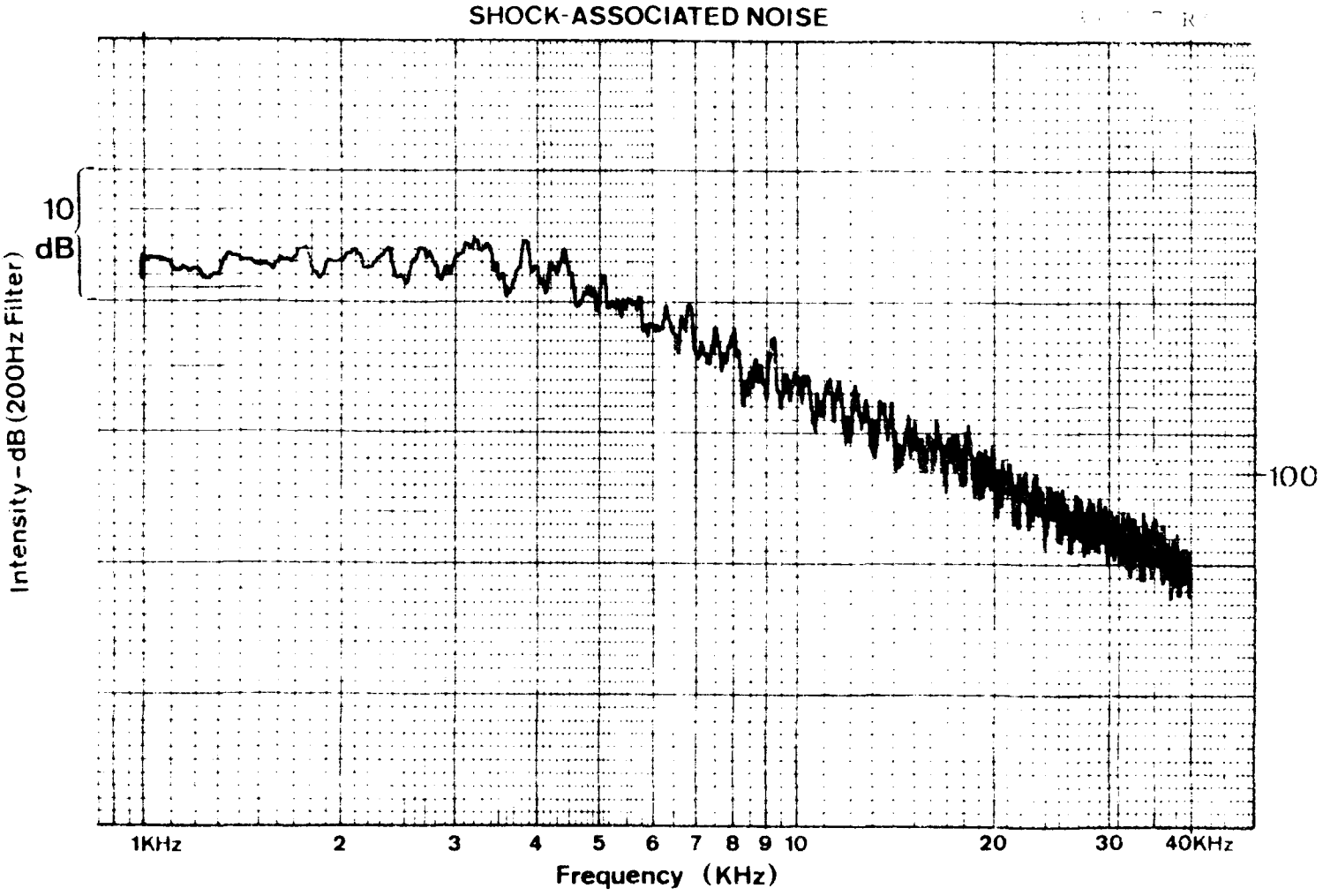
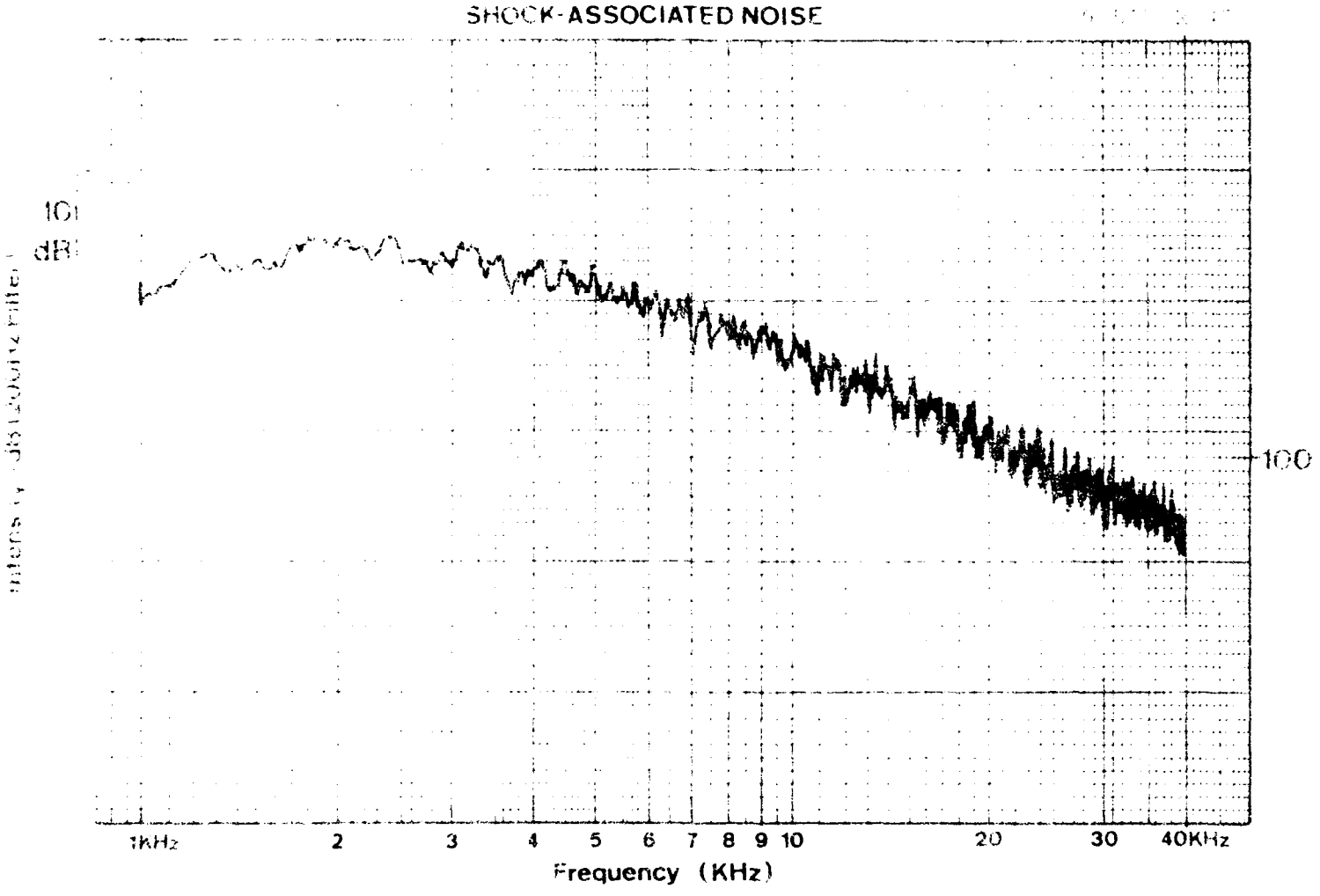
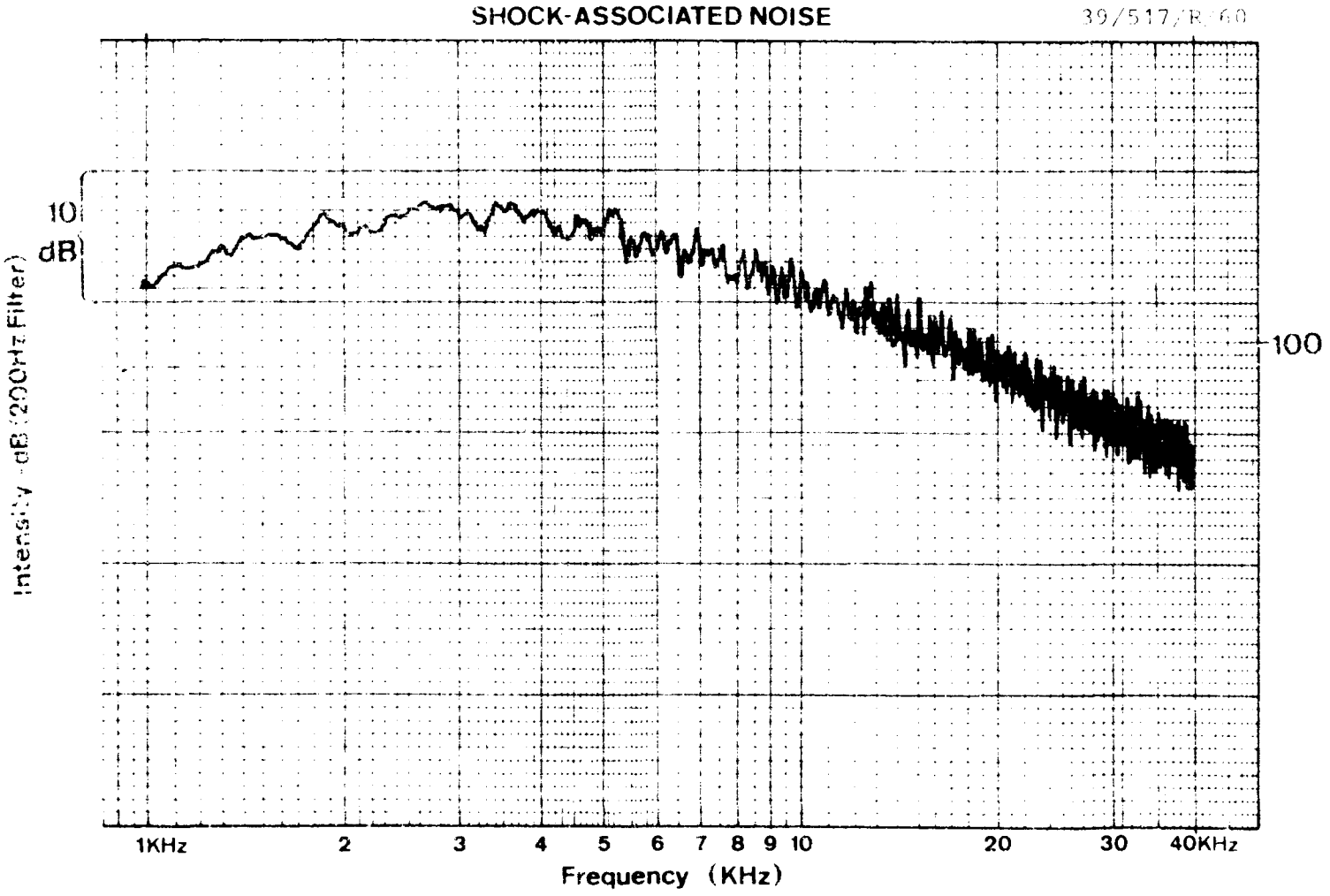
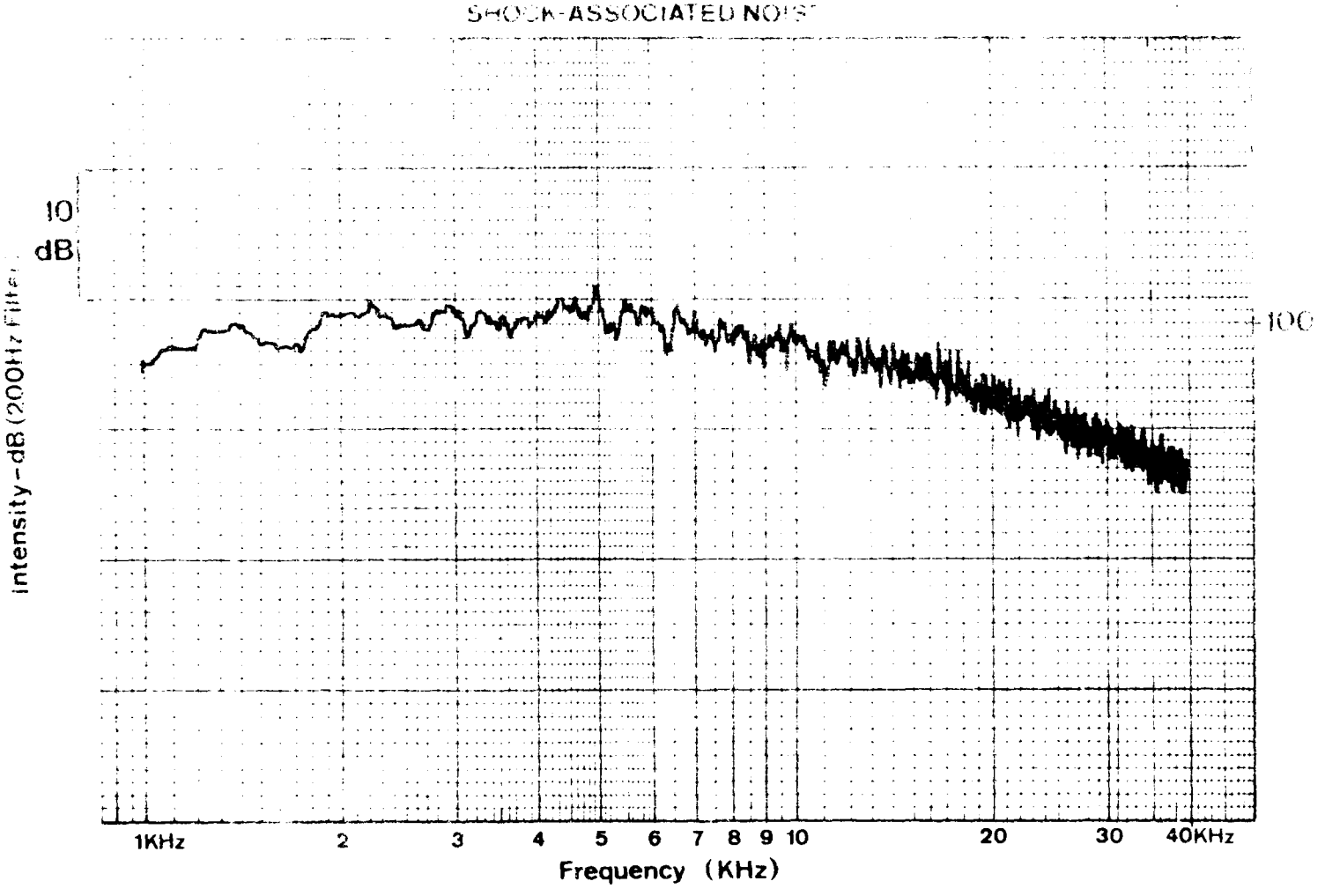
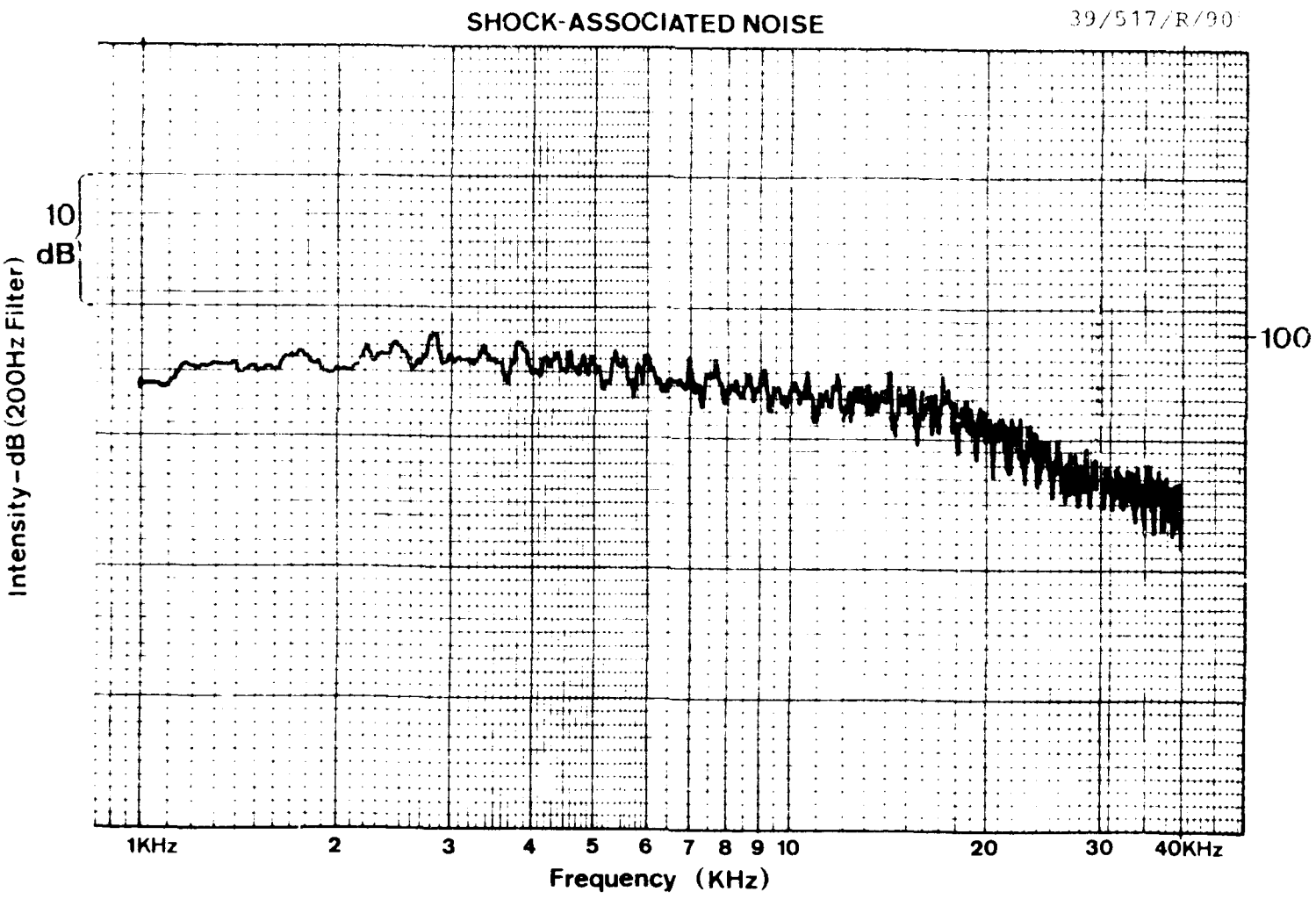
6
7
8
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
10
dB
Intensity - dB (200Hz Filter)
100
1KHz
2
3
4
5
6
7
8
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
100
1KHz
2
3
4
5
6
7
8
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
39/517/R 60
10
dB
100
Intensity - dB (200Hz Filter)
1KHz
2
3
4
5
6
7
8
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
10
dB
100
Intensity - dB (200Hz Filter)
1KHz
2
3
4
5
6
7
8
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
39/517/R/90
10
dB
Intensity-dB (200Hz Filter)
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1KHz
2
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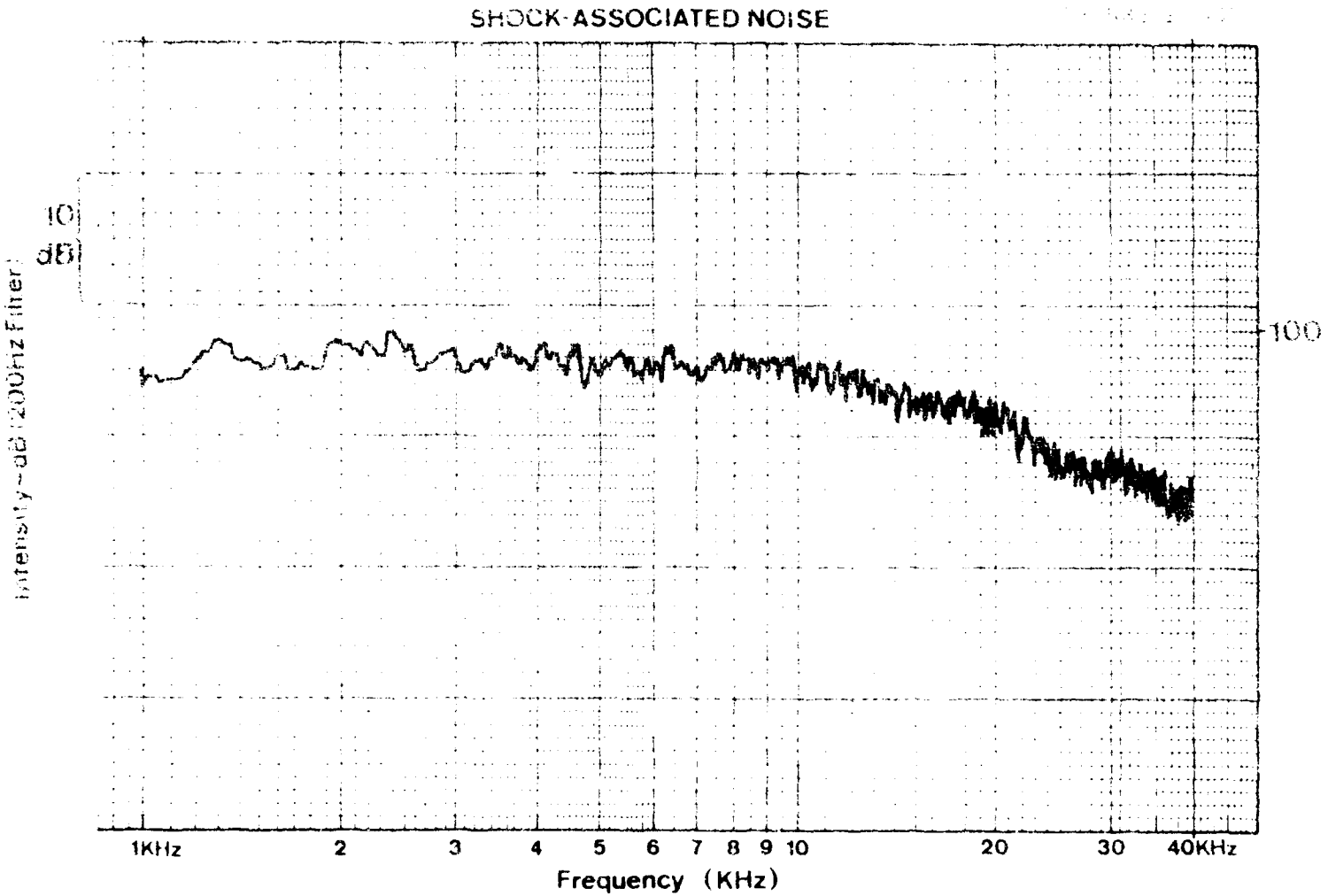
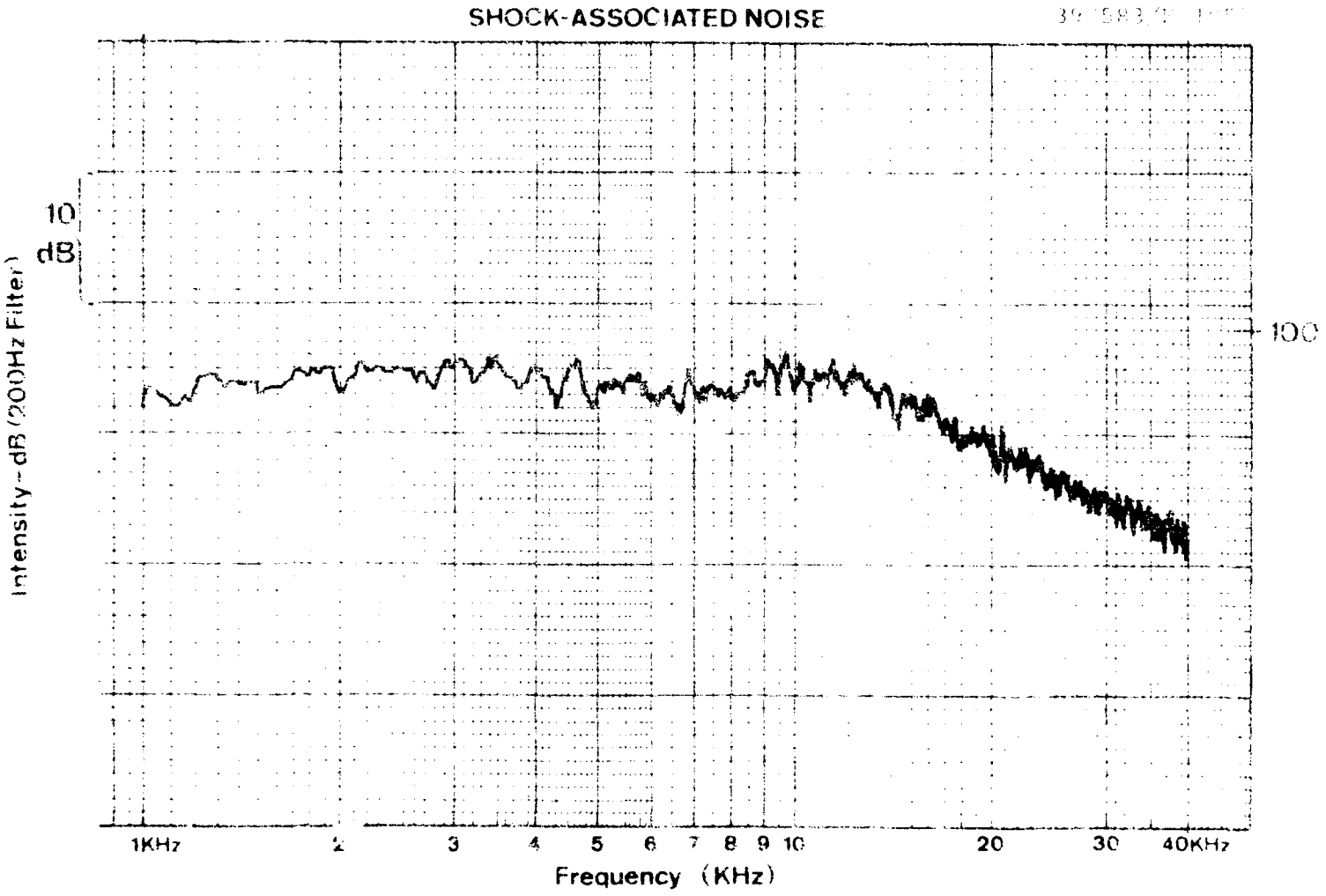
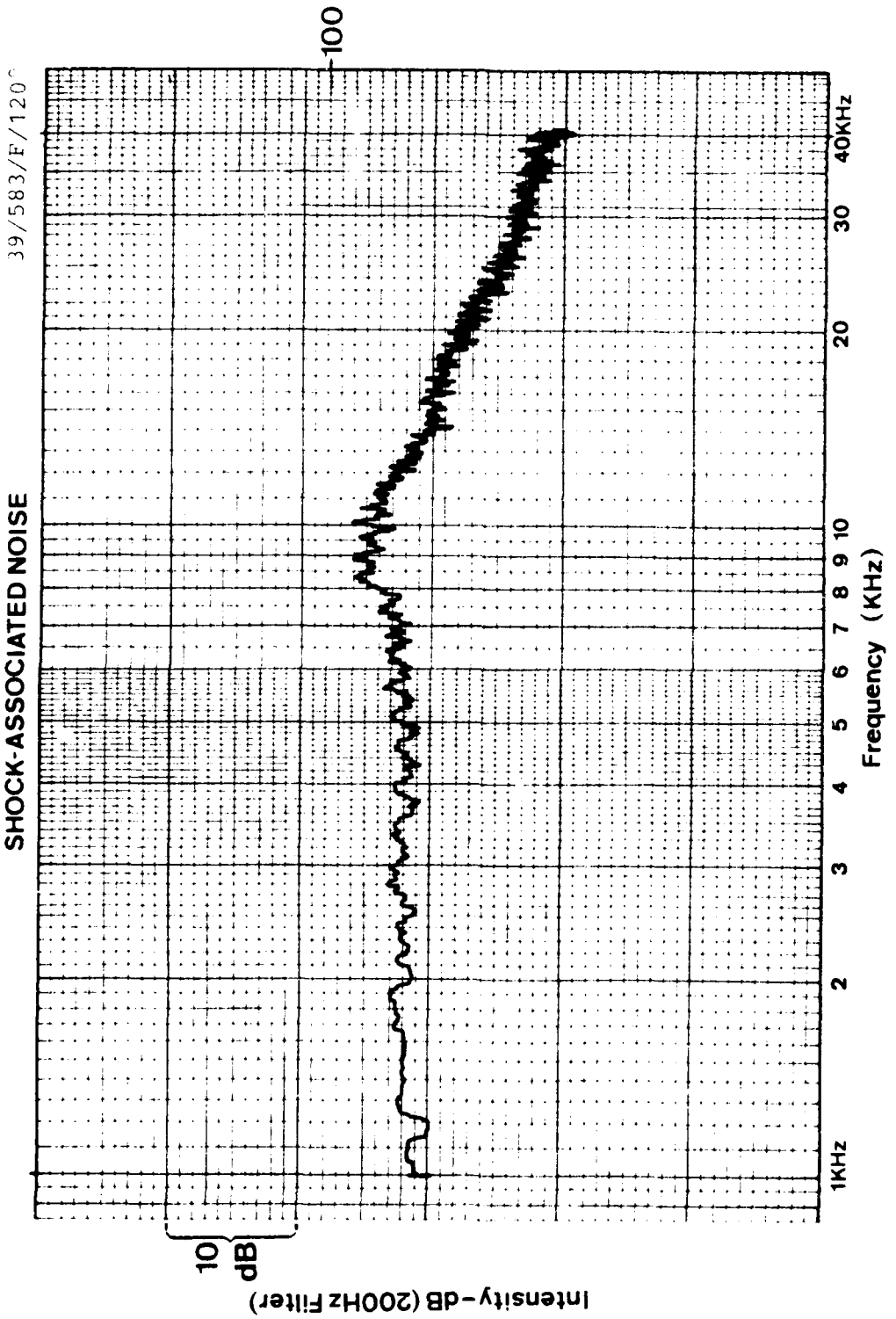
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
10
dB
100
1KHz
2
3
4
5
6
7
8
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
10 dB
100
Intensity - dB (20Hz Filter)
1KHz
2
3
4
5
6
7
8
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
39/583/F/120
100
10 dB
Intensity – dB (200Hz Filter)
1KHz
2
3
4
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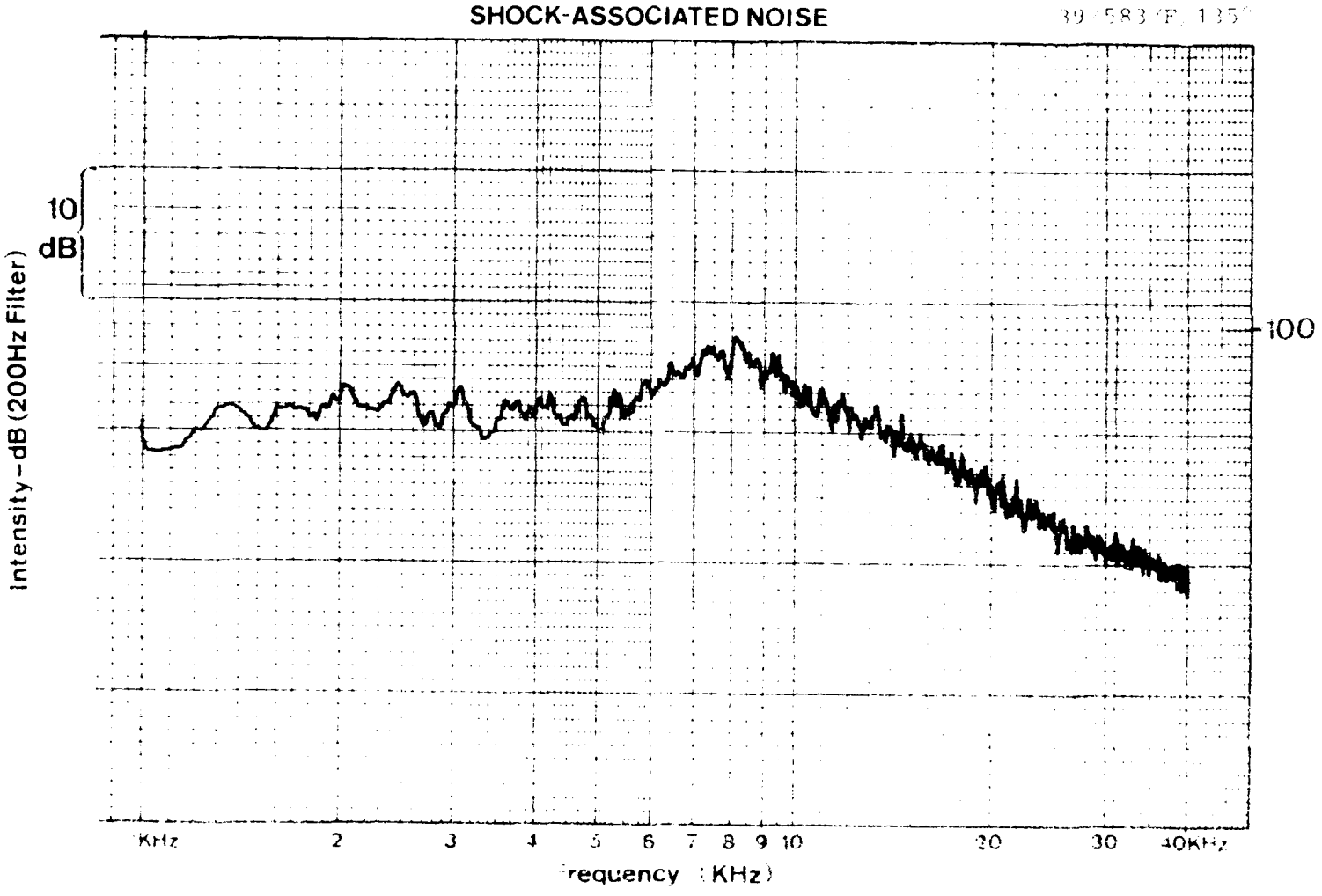
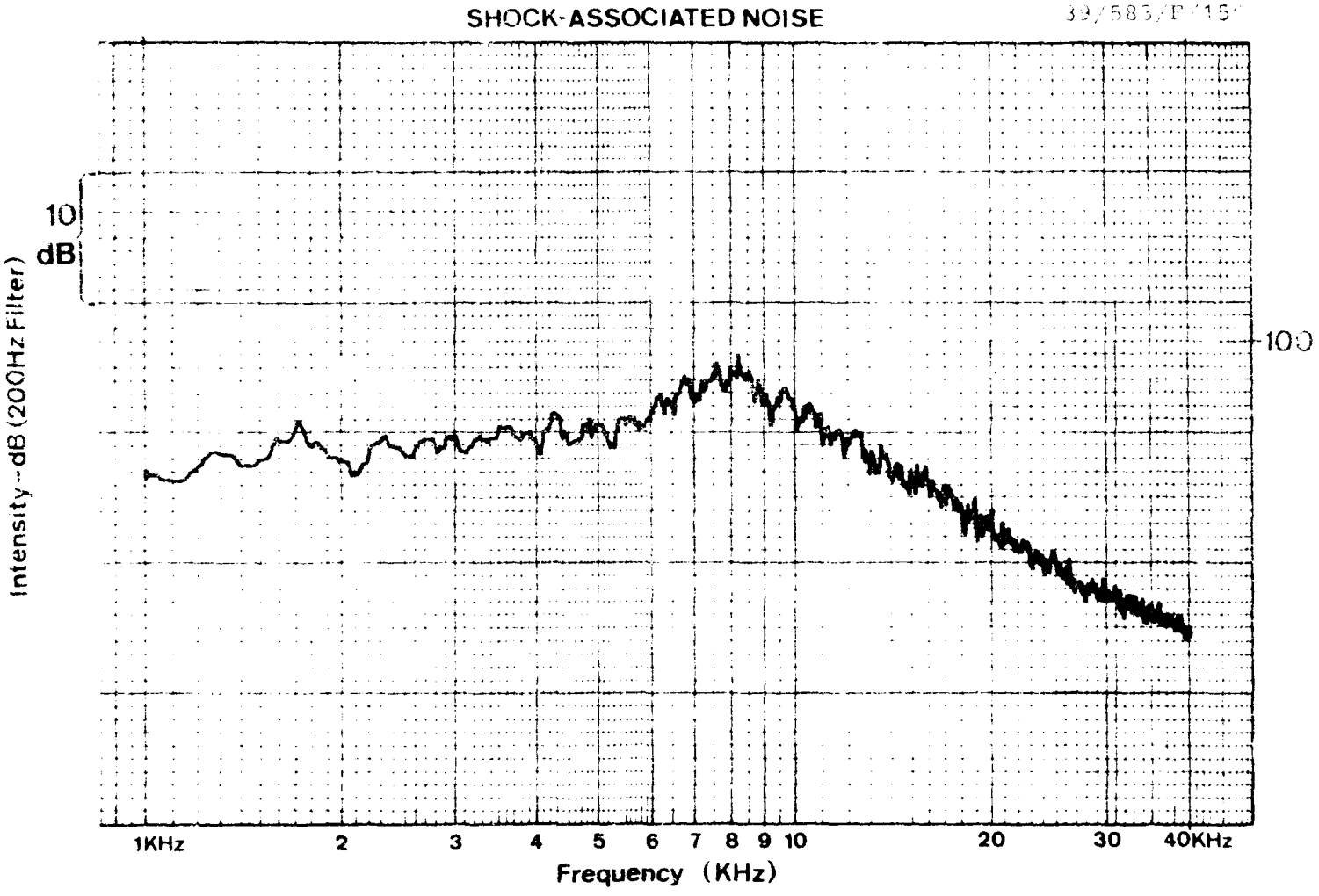
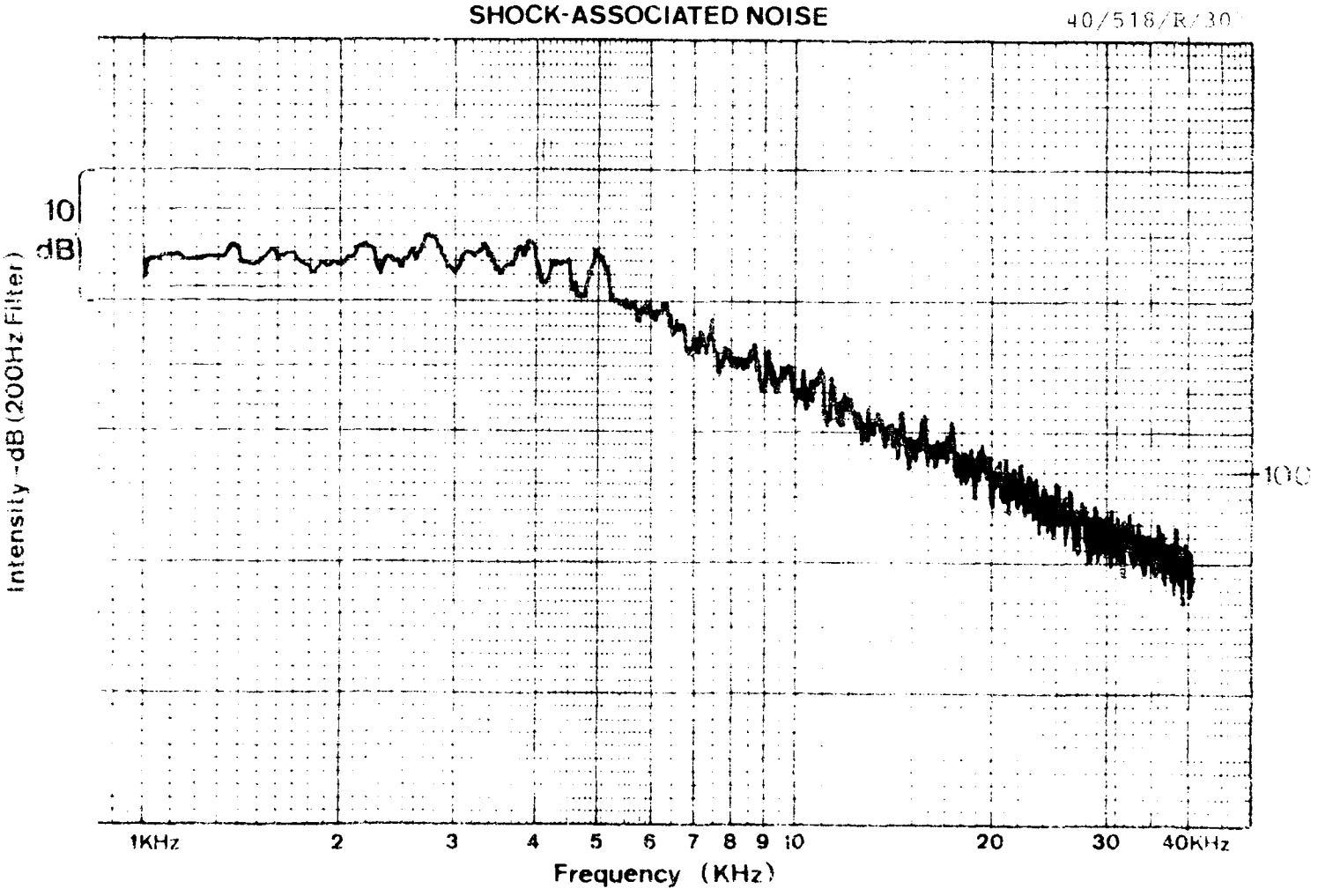
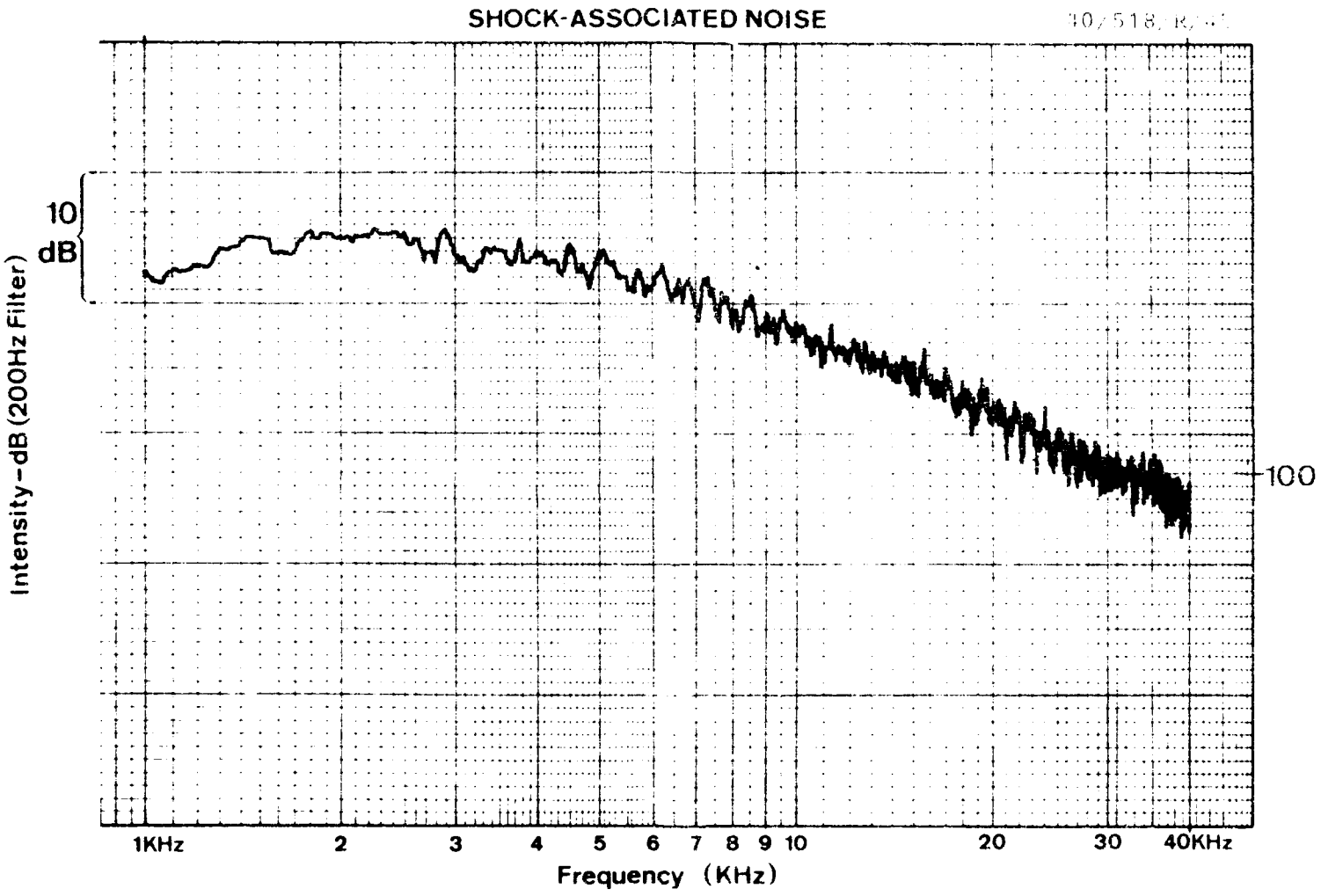
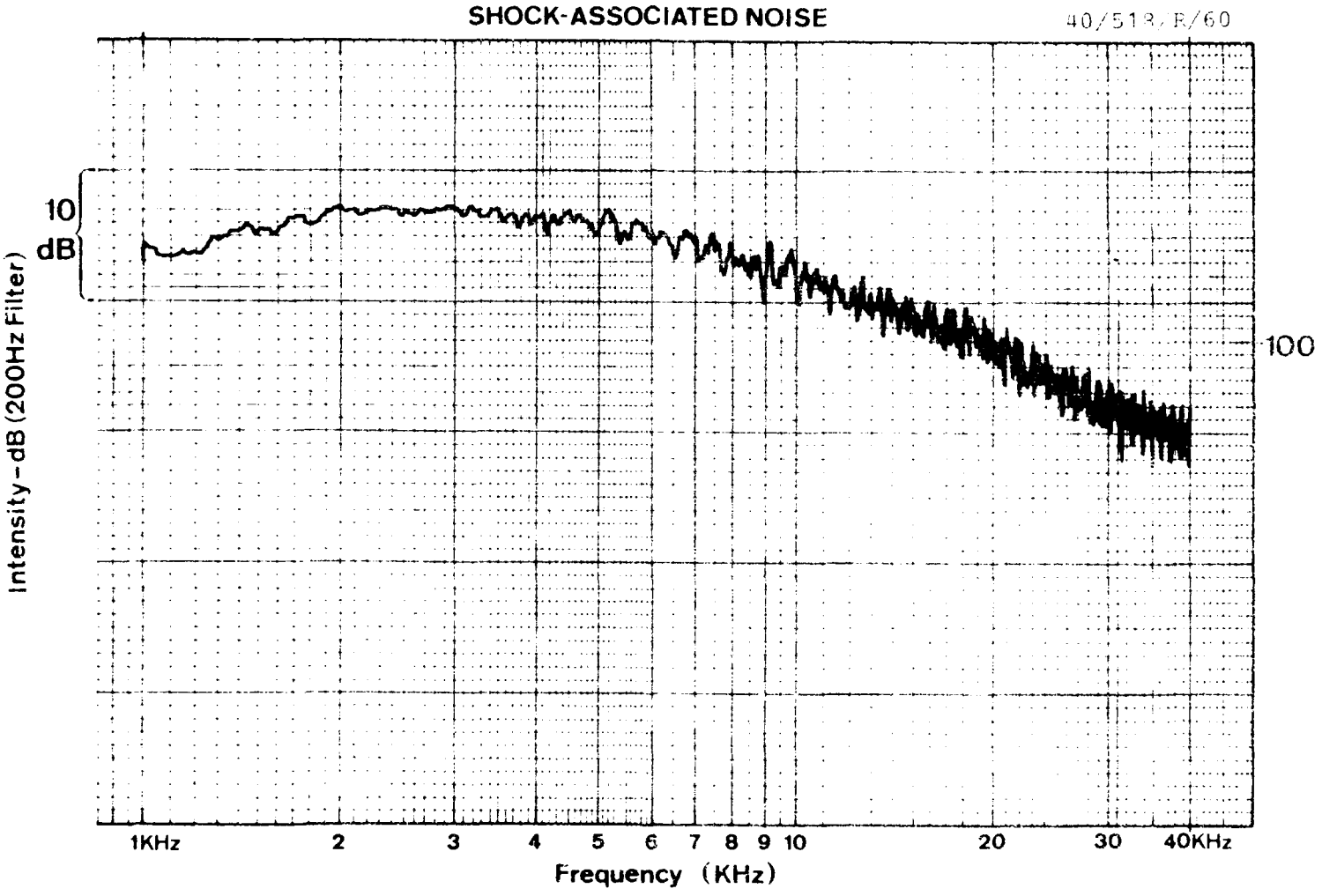
8
9
10
20
30
40KHz
Frequency (KHz)

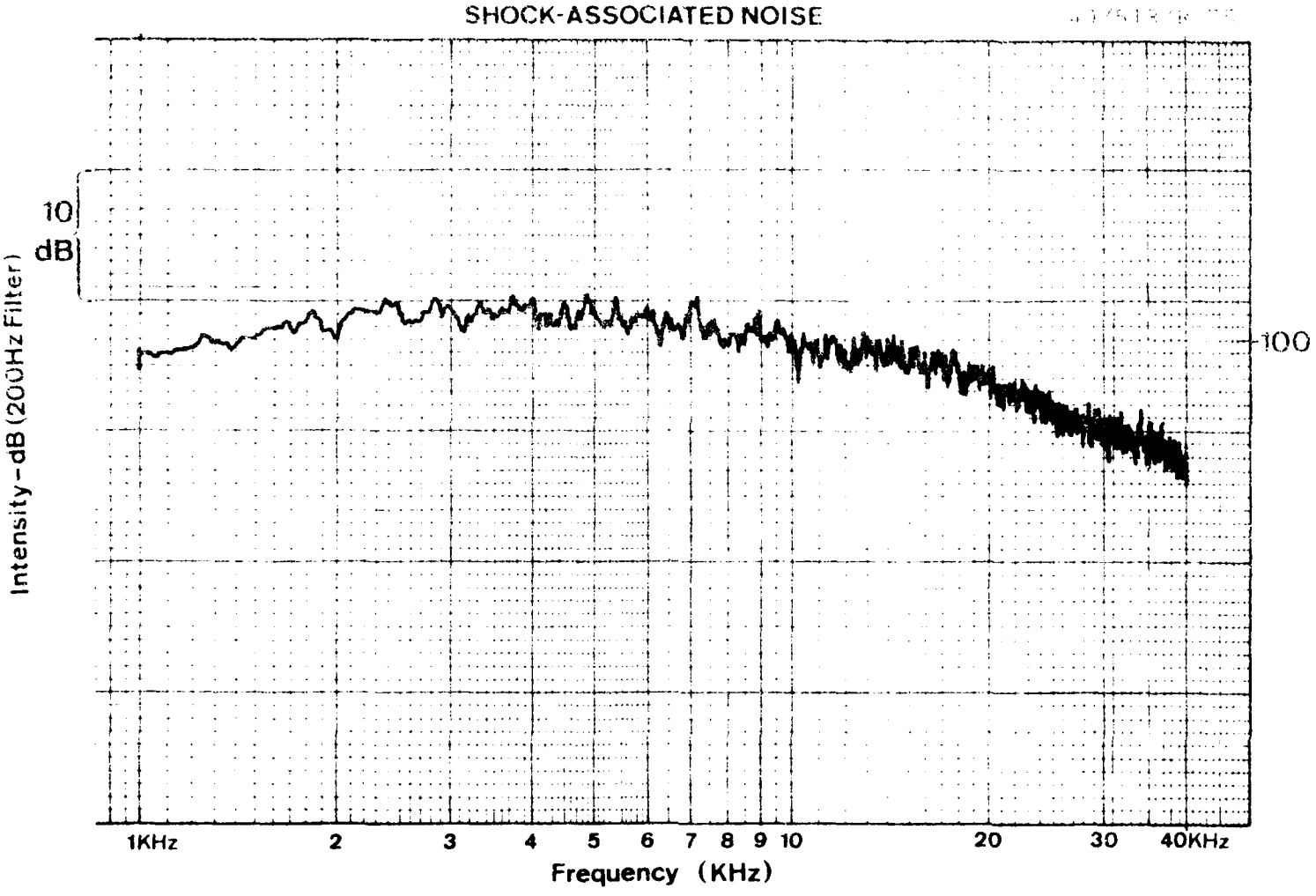

SHOCK-ASSOCIATED NOISE
10
dB
Intensity - dB (200Hz Filter)
100
KHz
2
3
4
5
6
7
8
9
10
20
30
40KHz
Frequency (KHz)

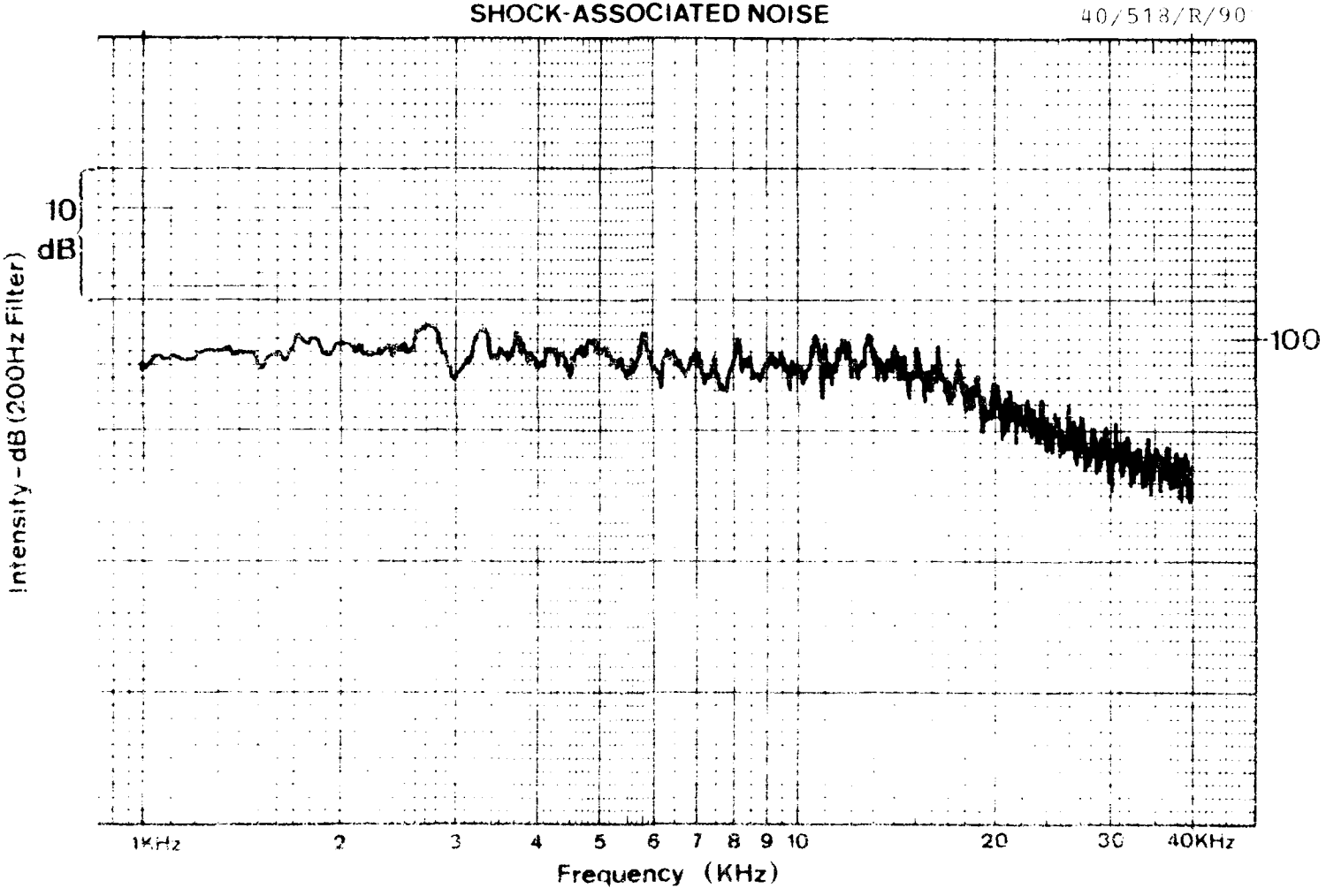

SHOCK-ASSOCIATED NOISE
10
dB
Intensity - dB (200Hz Filter)
100
1KHz
2
3
4
5
6
7
8
9
10
20
30
40KHz
Frequency (KHz)

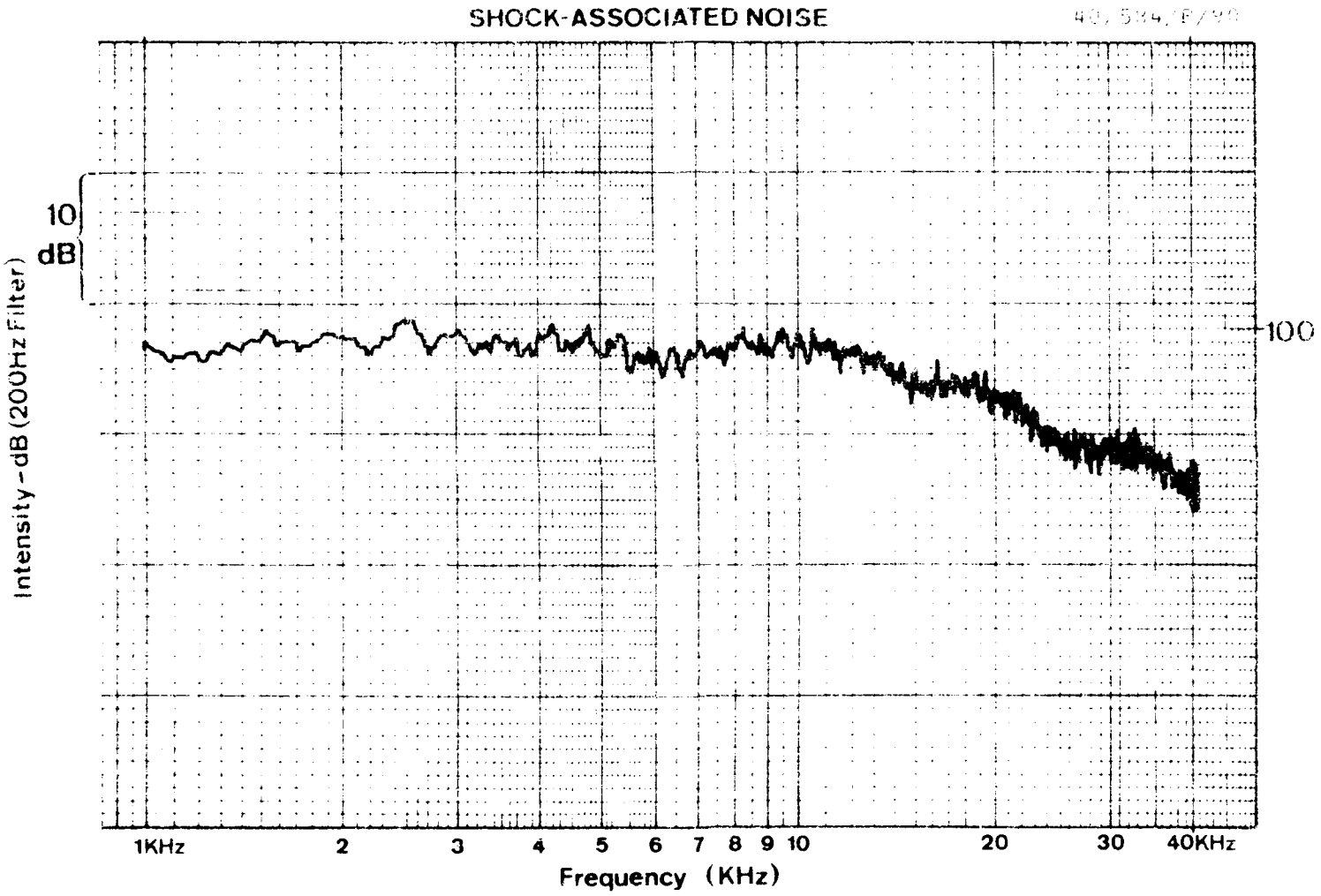

SHOCK-ASSOCIATED NOISE
40/518/R/30
10 dB
Intensity - dB (200Hz Filter)
1KHz
2
3
4
5
6
7
8
9
10
20
30
40KHz
Frequency (KHz)

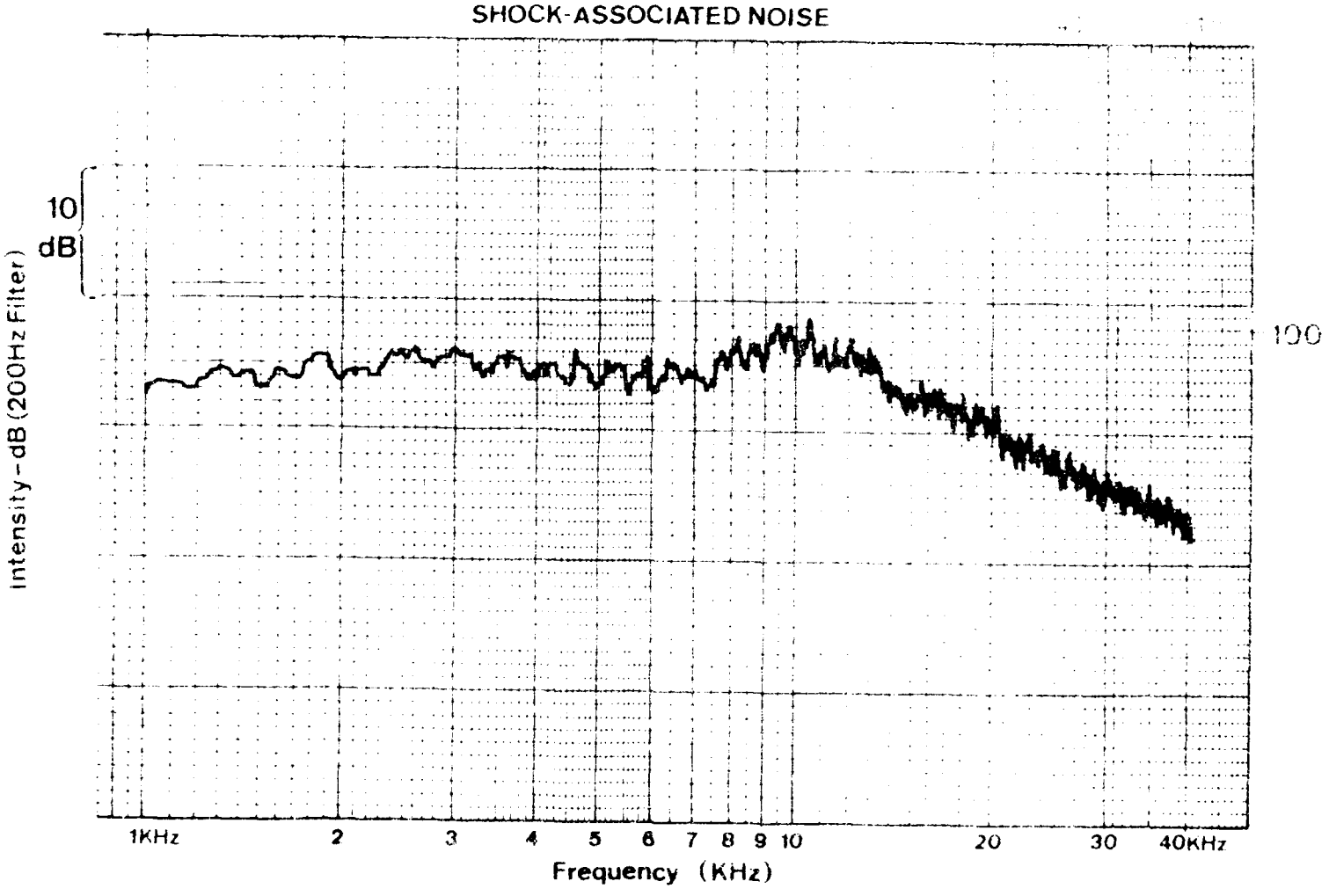

SHOCK-ASSOCIATED NOISE
10
dB
Intensity-dB (200Hz Filter)
100
1KHz
2
3
4
5
6
7
8
9
10
20
30
40KHz
Frequency (KHz)

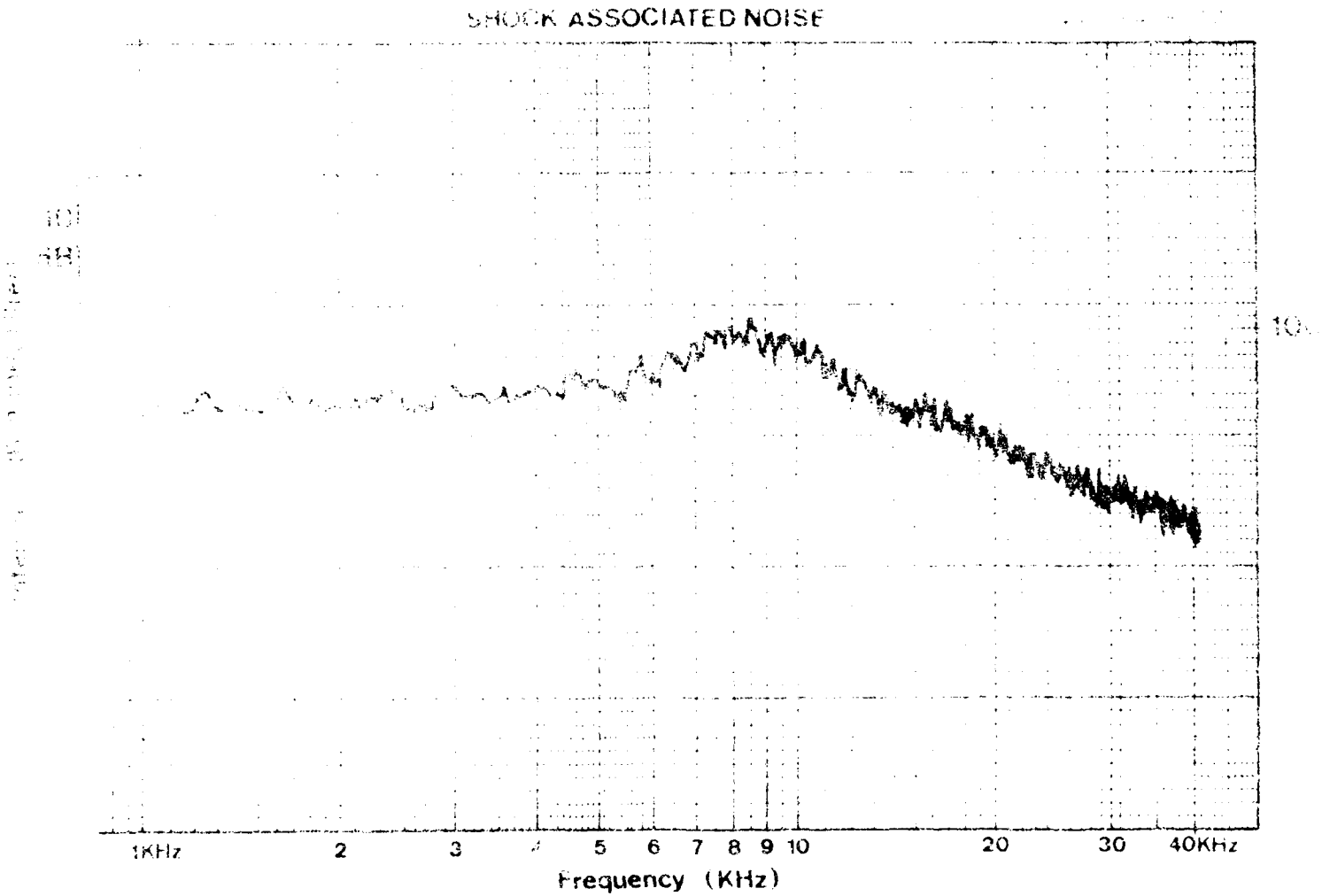

SHOCK-ASSOCIATED NOISE
40/518/R/60
10
dB
Intensity - dB (200Hz Filter)
100
1KHz
2
3
4
5
6
7
8
9
10
20
30
40KHz
Frequency (KHz)

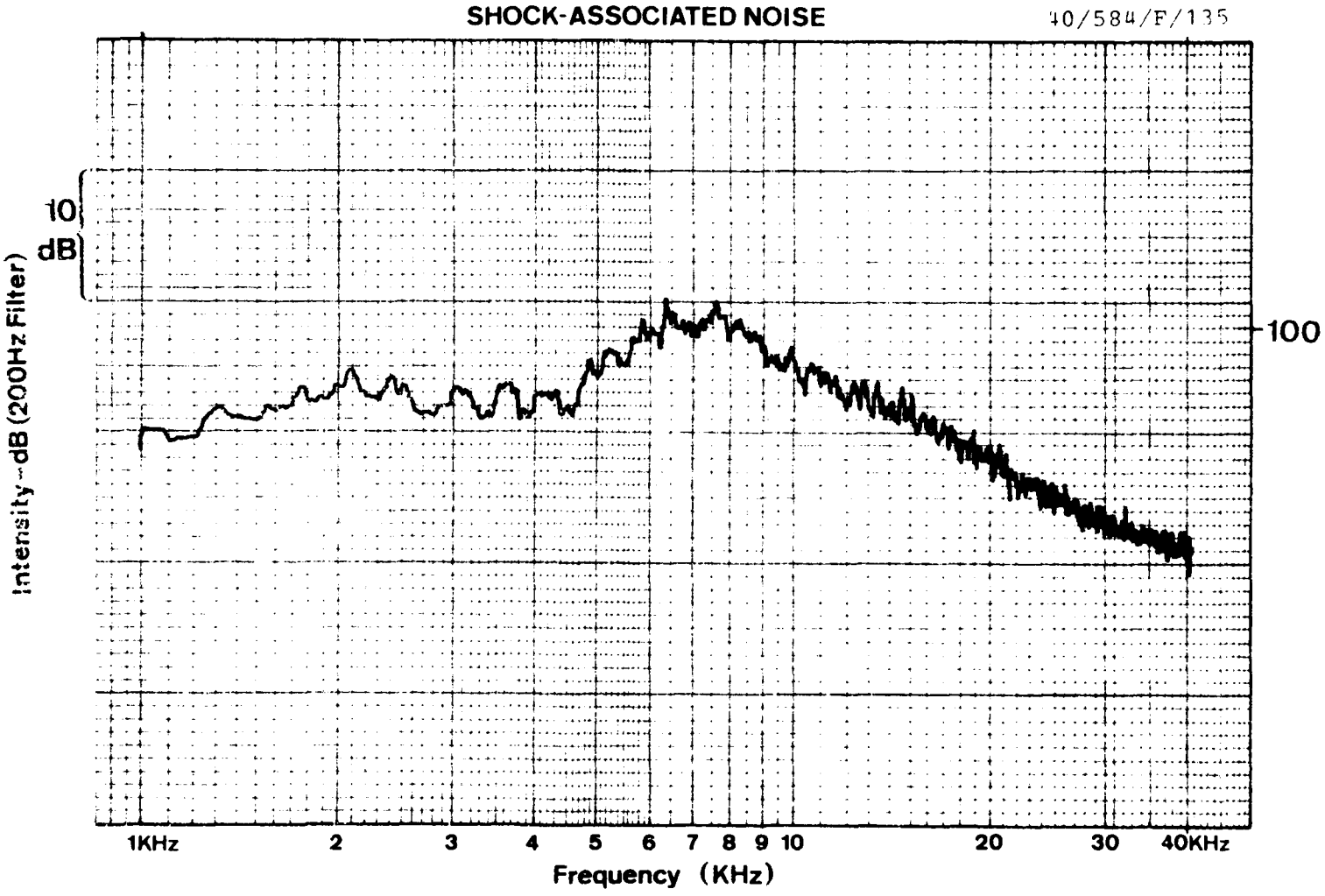

SHOCK-ASSOCIATED NOISE
10
dB
Intensity - dB (200Hz Filter)
100
1KHz
2
3
4
5
6
7
8
9
10
20
30
40KHz
Frequency (KHz)

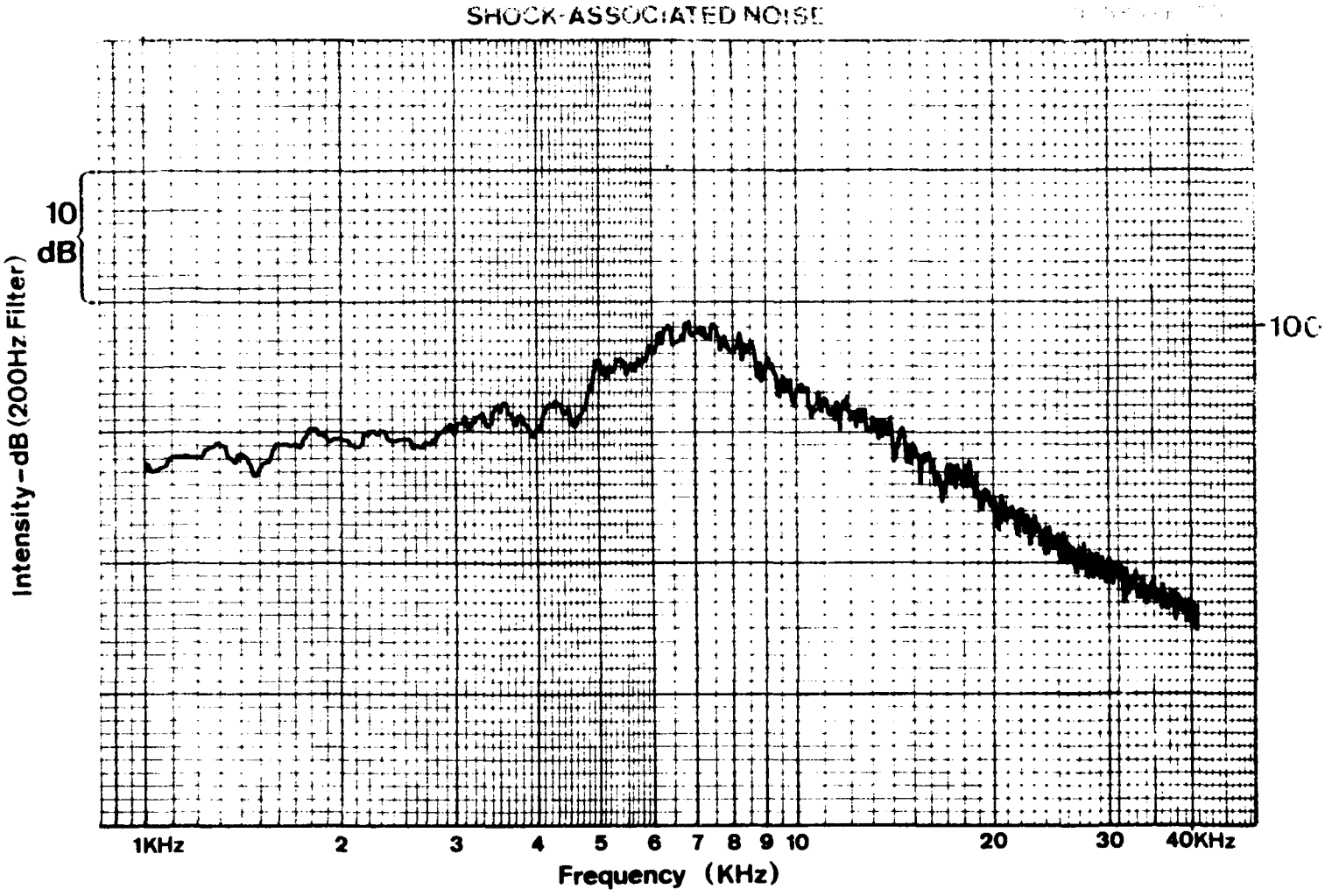

SHOCK-ASSOCIATED NOISE
40/518/R/90
10
dB
Intensity - dB (200Hz Filter)
100
1KHz
2
3
4
5
6
7
8
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
10
dB
Intensity - dB (200Hz Filter)
100
1KHz
2
3
4
5
6
7
8
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
10
dB
Intensity - dB (200Hz Filter)
100
1KHz
2
3
4
5
6
7
8
9
10
20
30
40KHz
Frequency (KHz)


SHOCK ASSOCIATED NOISE
1KHz
2
3
5
6
7
8
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
40/584/F/135
10 dB
100
Intensity - dB (200Hz Filter)
1KHz
2
3
4
5
6
7
8
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
10
dB
Intensity-dB (200Hz Filter)
100
1KHz
2
3
4
5
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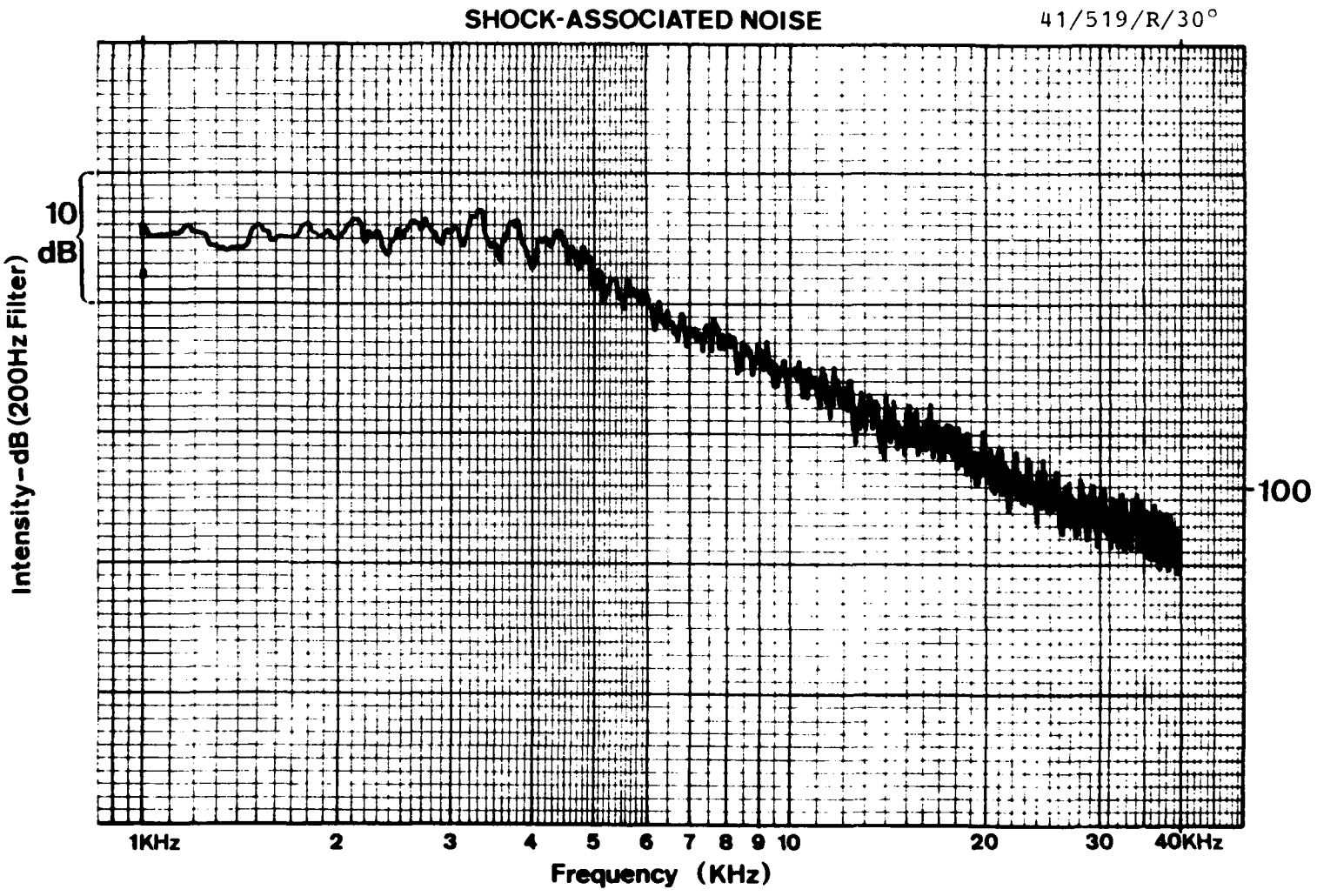
7
8
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
41/519/R/30°
10
dB
Intensity-dB (200Hz Filter)
100
1KHz
2
3
4
5
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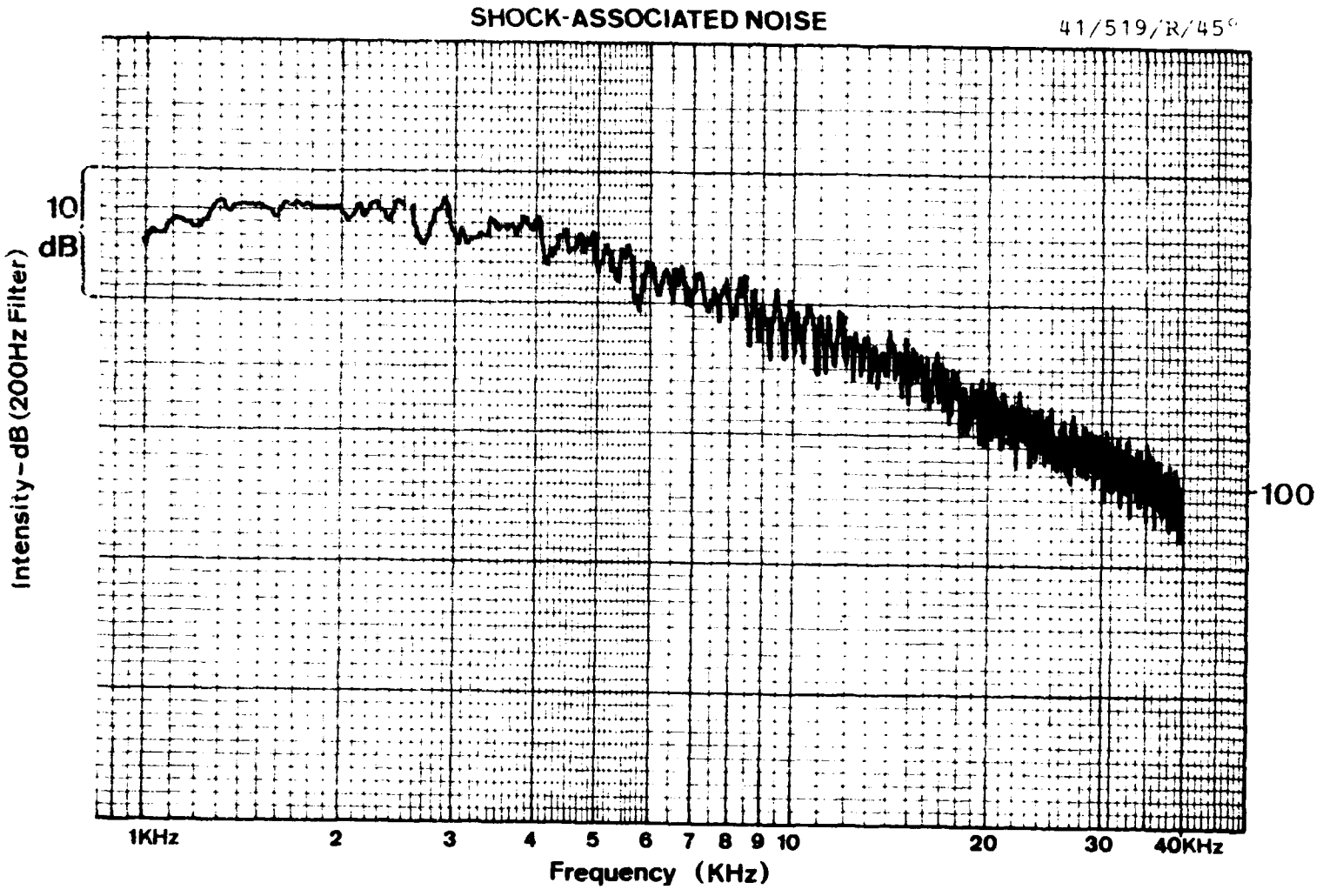
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
41/519/R/45°
10
dB
Intensity-dB (200Hz Filter)
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1KHz
2
3
4
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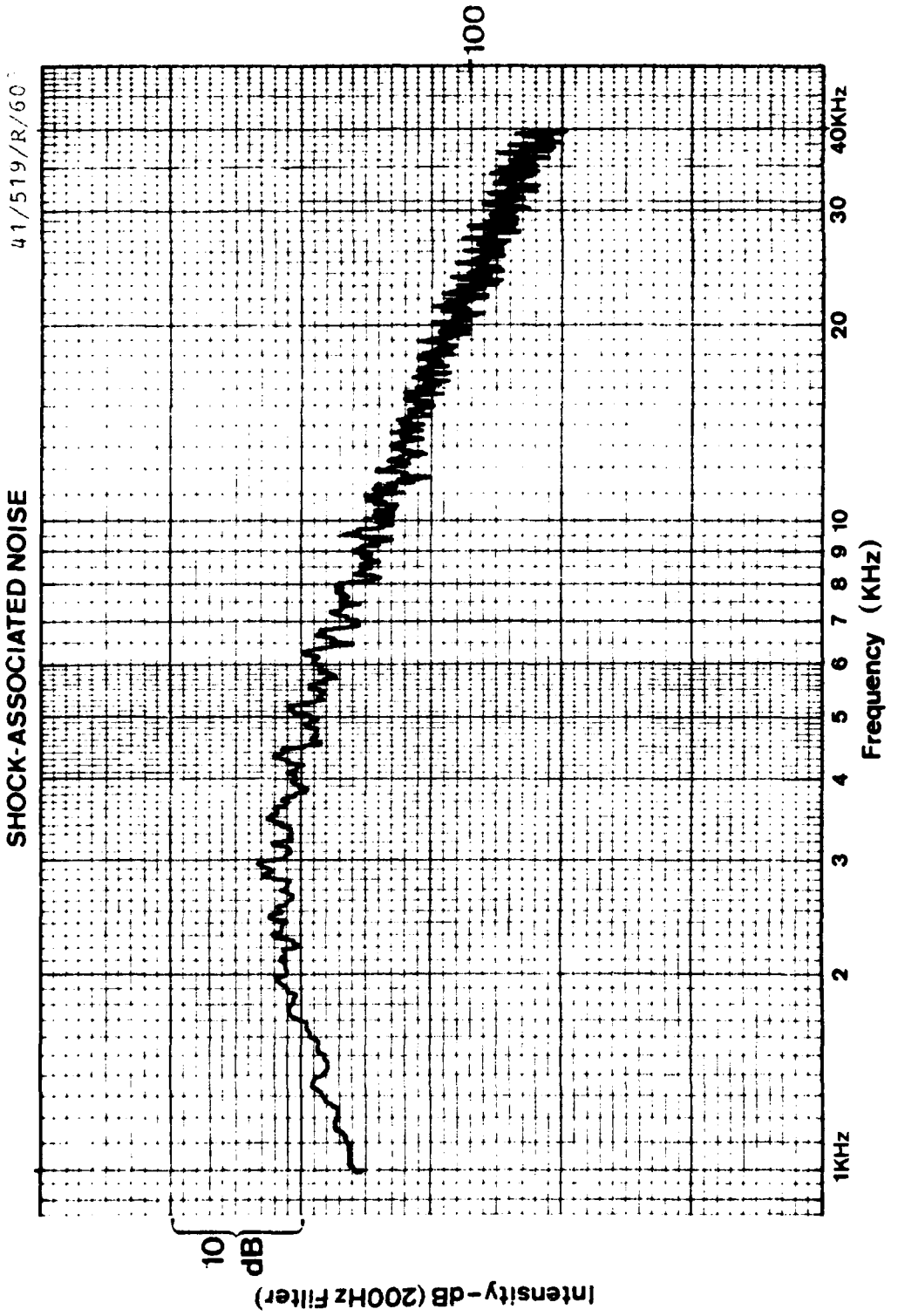
7
8
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
41/519/R/60
100
10 dB
Intensity–dB (200Hz Filter)
1KHz
2
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10
20
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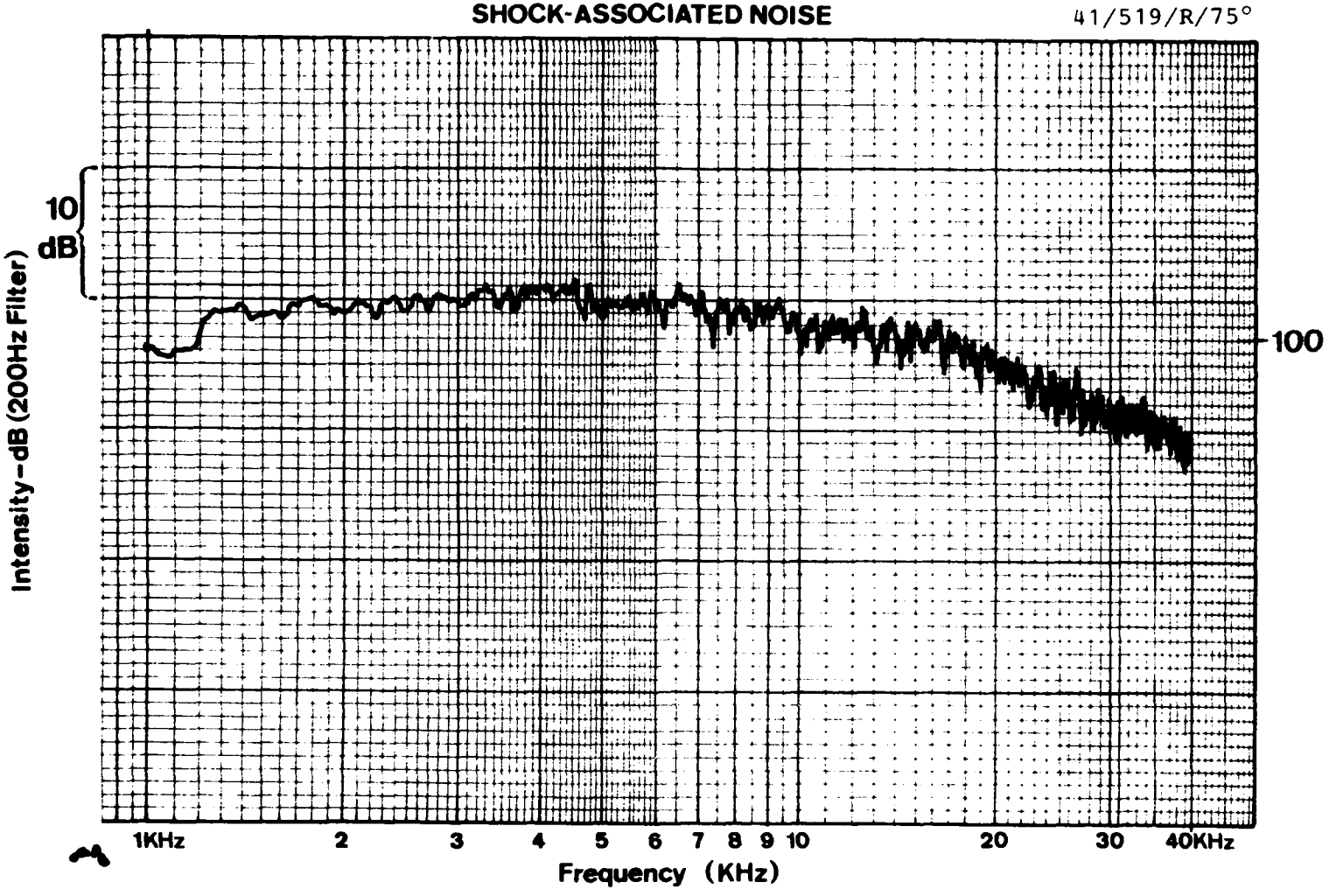
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
41/519/R/75°
10
dB
Intensity-dB (200Hz Filter)
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1KHz
2
3
4
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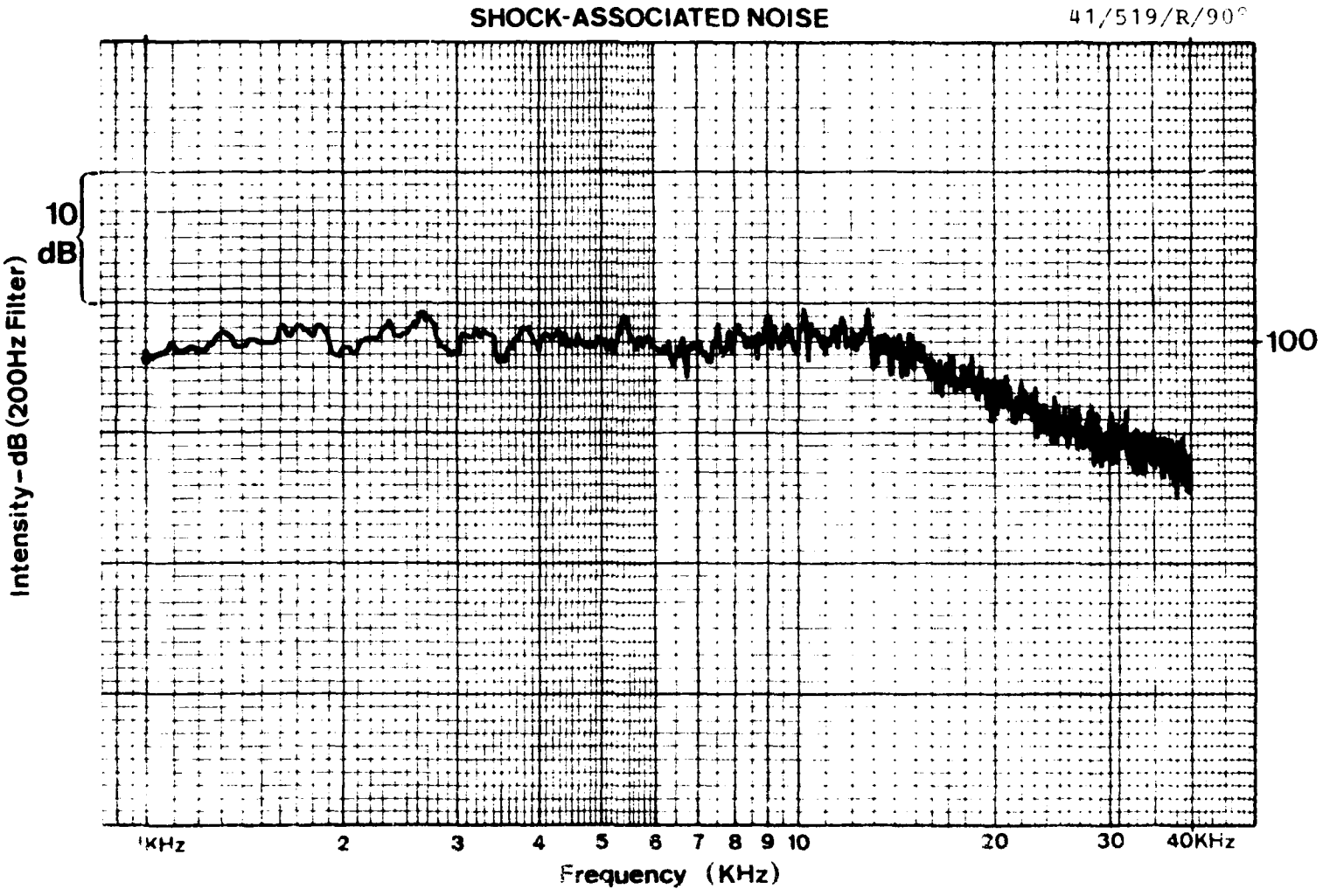
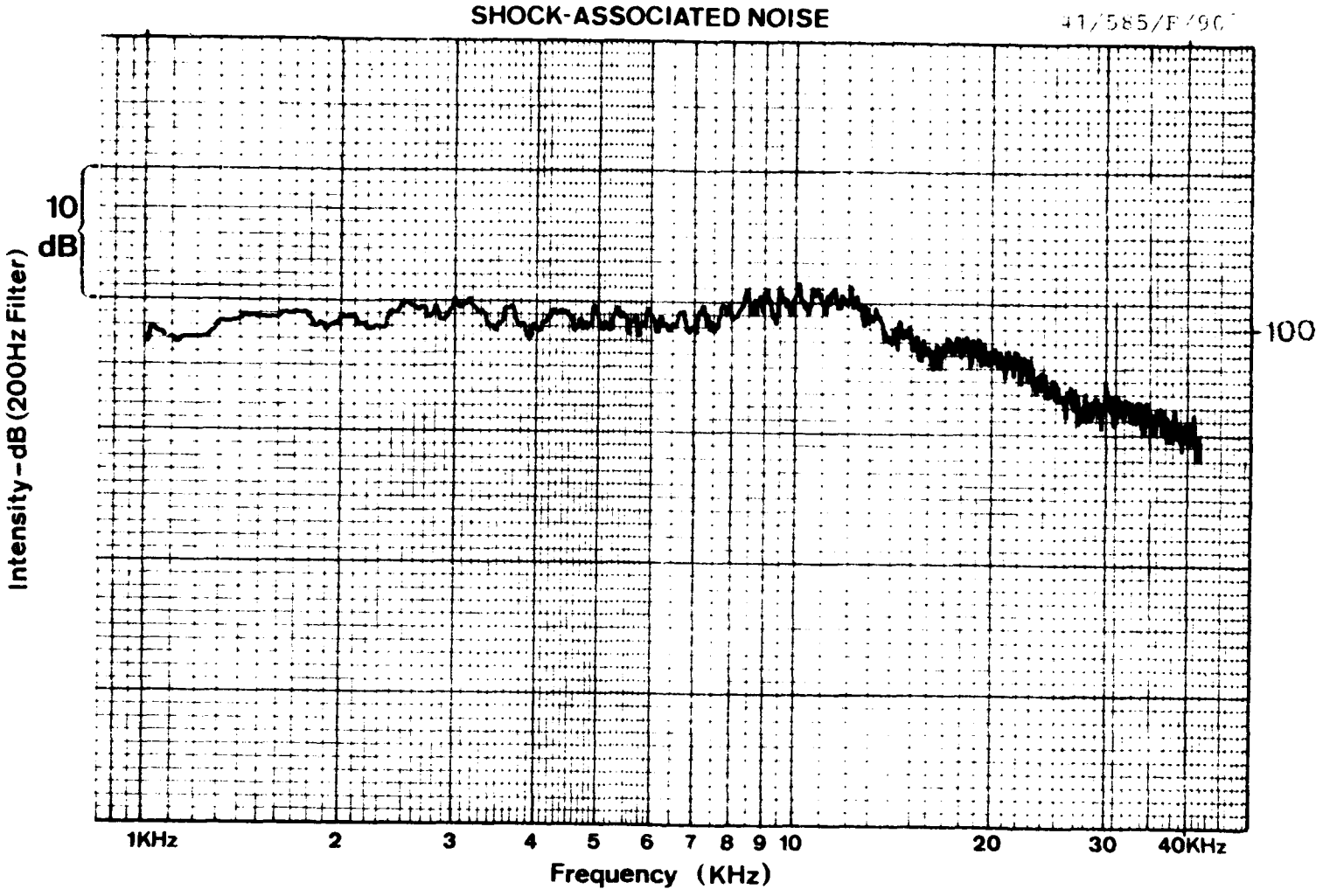
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
41/519/R/90
10
dB
Intensity-dB (200Hz Filter)
100
1KHz
2
3
4
5
6
7
8
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
41/585/F/90
10
dB
Intensity-dB (200Hz Filter)
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1KHz
2
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4
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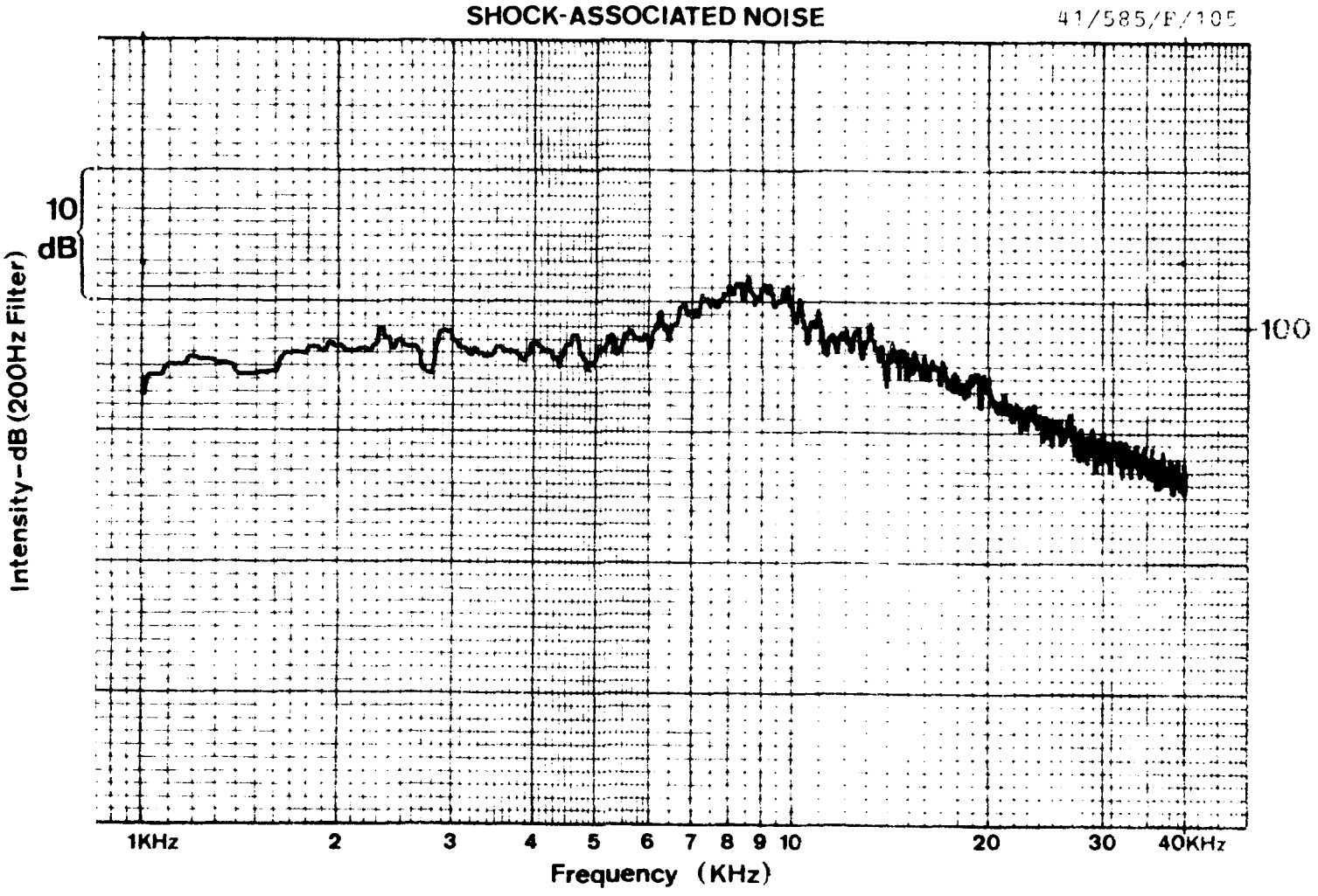
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
41/585/F/105
10
dB
Intensity-dB (200Hz Filter)
100
1KHz
2
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4
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6
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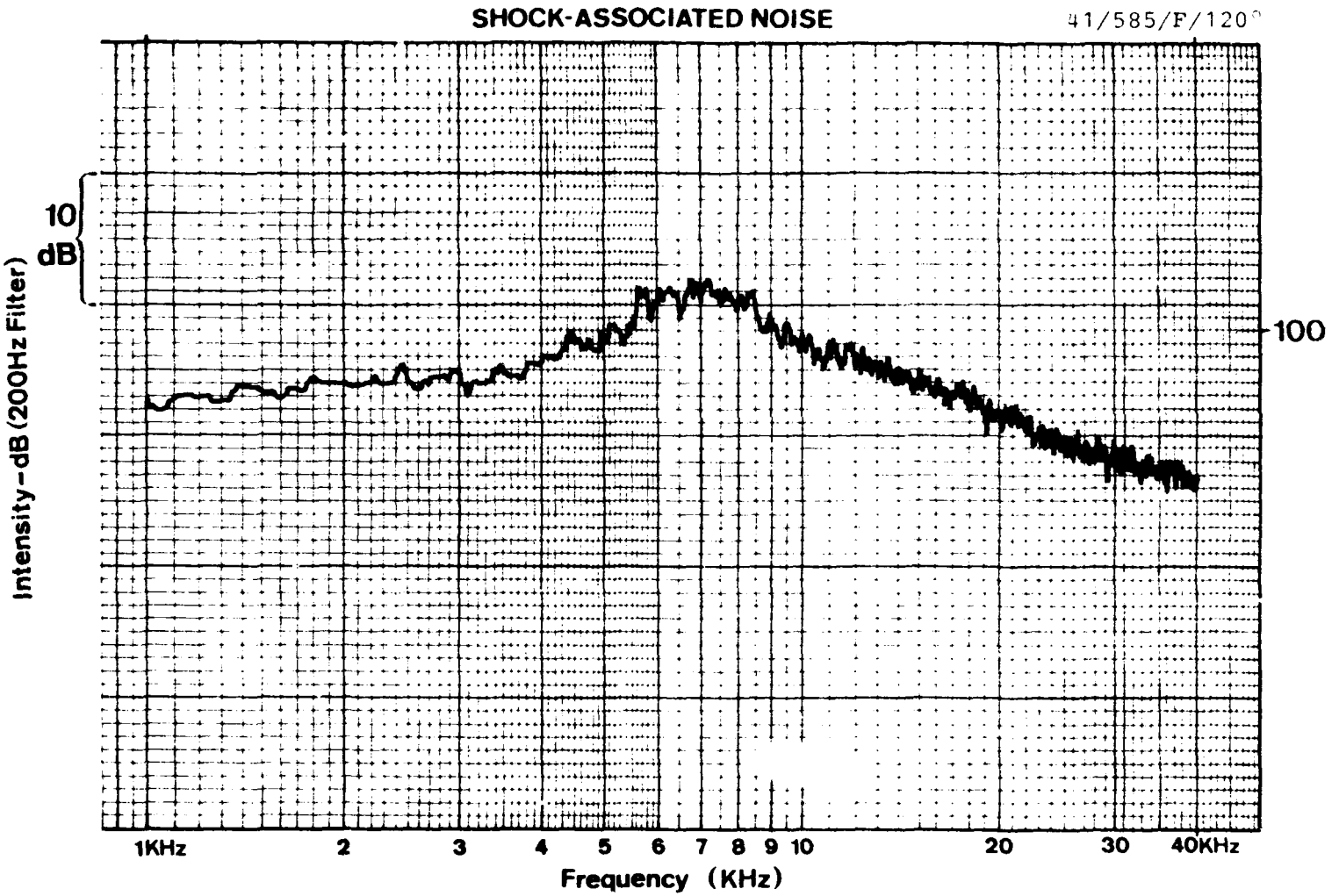
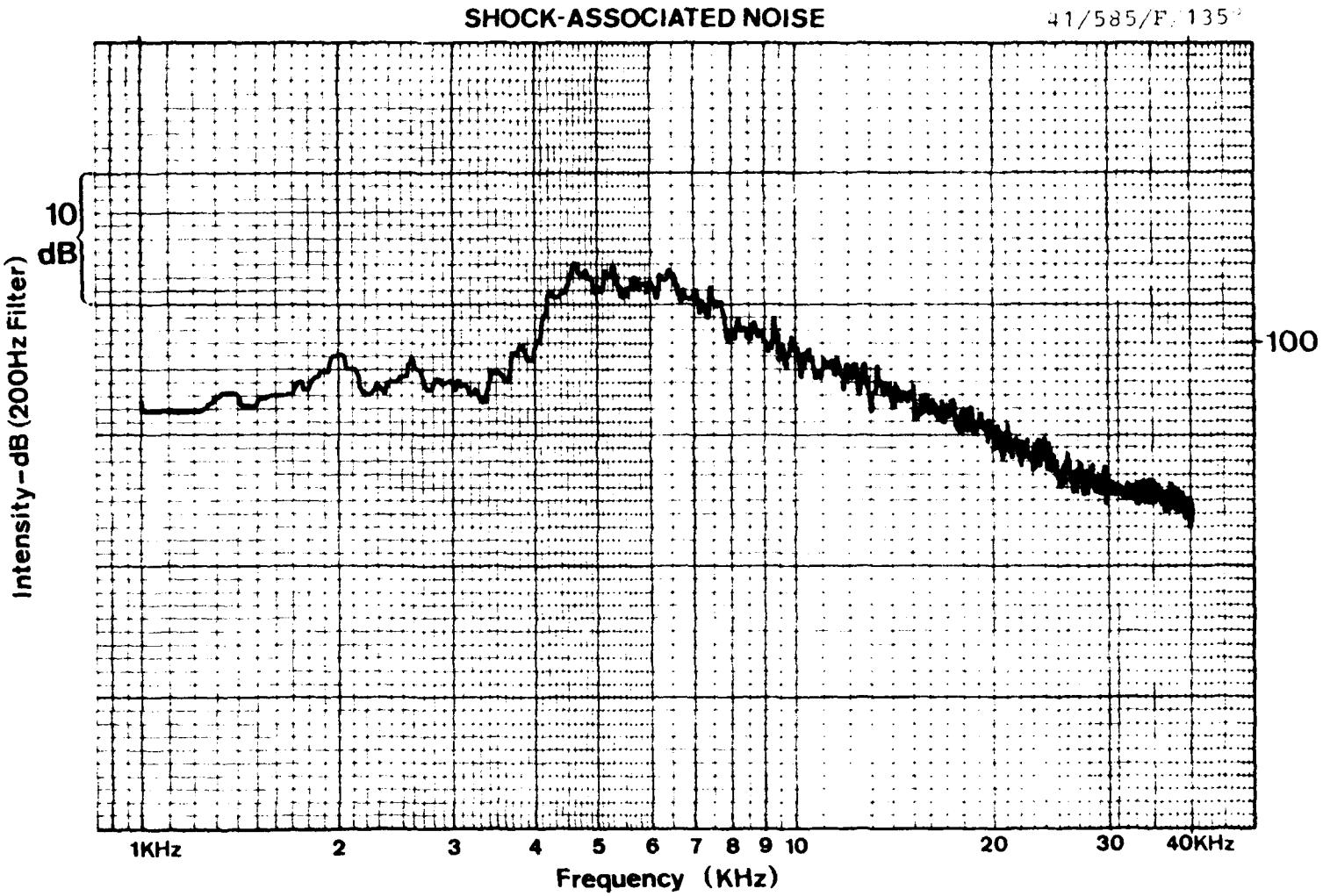
8
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
41/585/F/120°
10
dB
Intensity-dB (200Hz Filter)
100
1KHz
2
3
4
5
6
7
8
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
41/585/F 135
10
dB
Intensity-dB (200Hz Filter)
100
1KHz
2
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9
10
20
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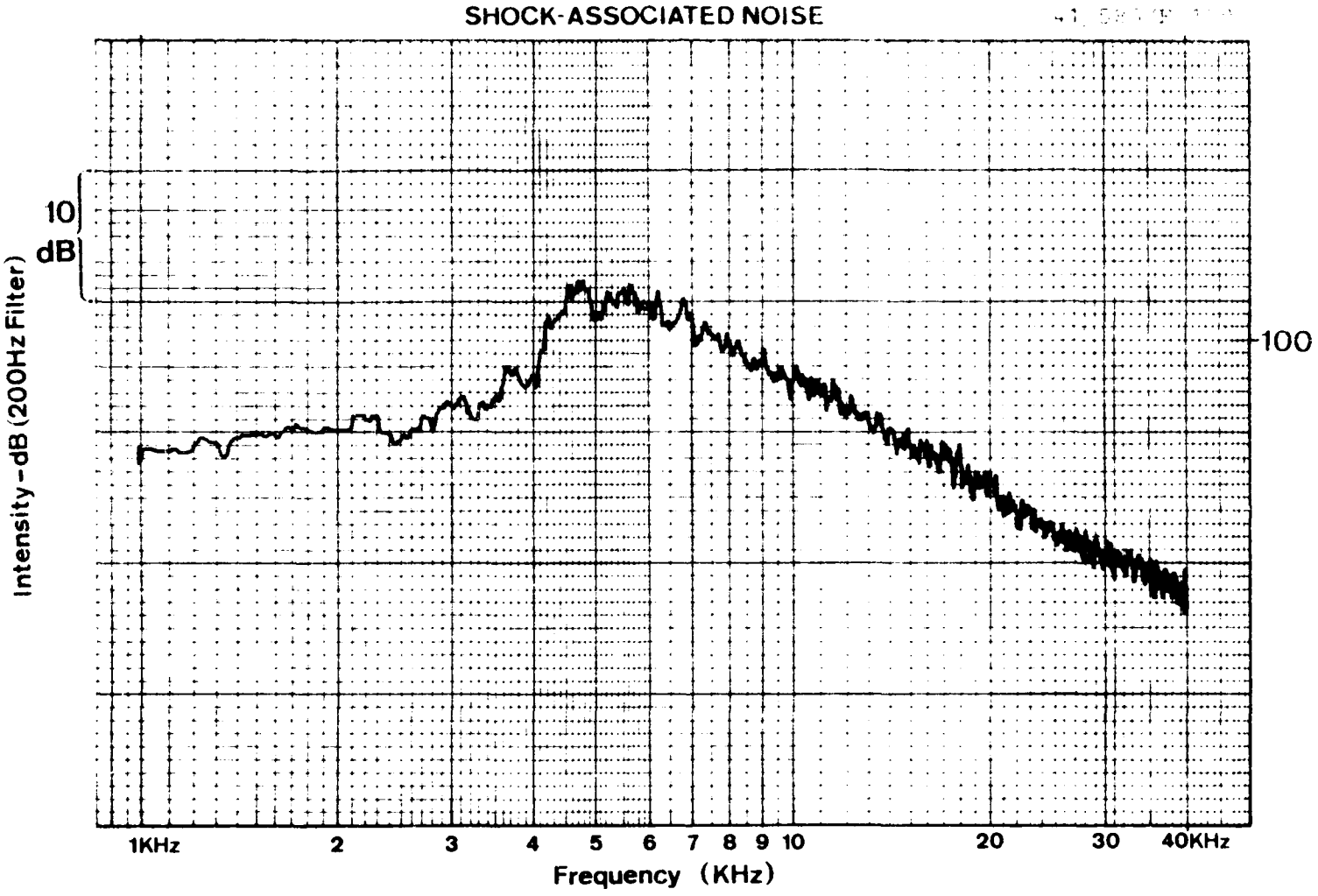
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
10
dB
Intensity - dB (200Hz Filter)
100
1KHz
2
3
4
5
6
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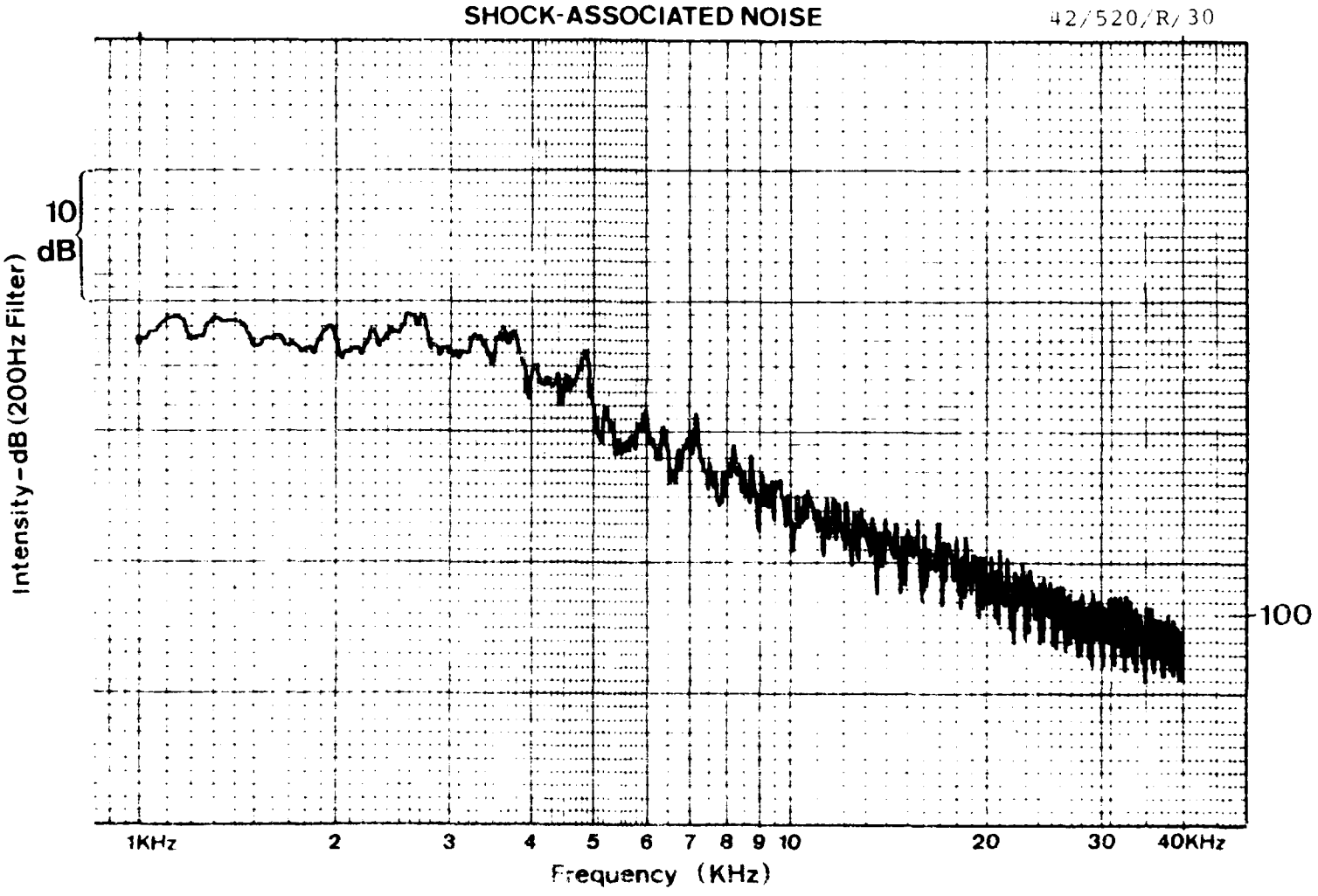
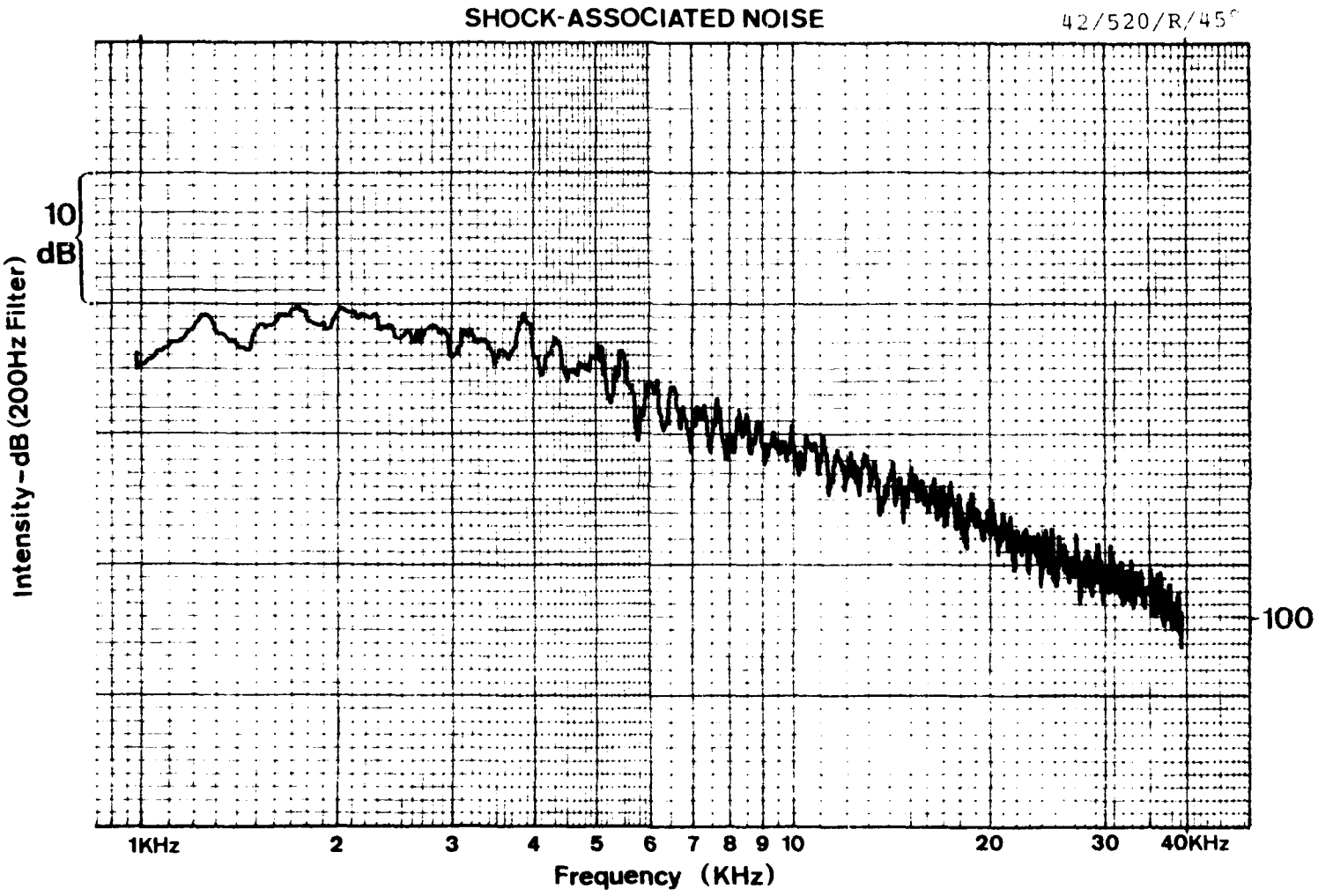
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
42/520/R/30
10
dB
Intensity - dB (200Hz Filter)
100
1KHz
2
3
4
5
6
7
8
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
42/520/R/45°
10
dB
Intensity-dB (200Hz Filter)
100
1KHz
2
3
4
5
6
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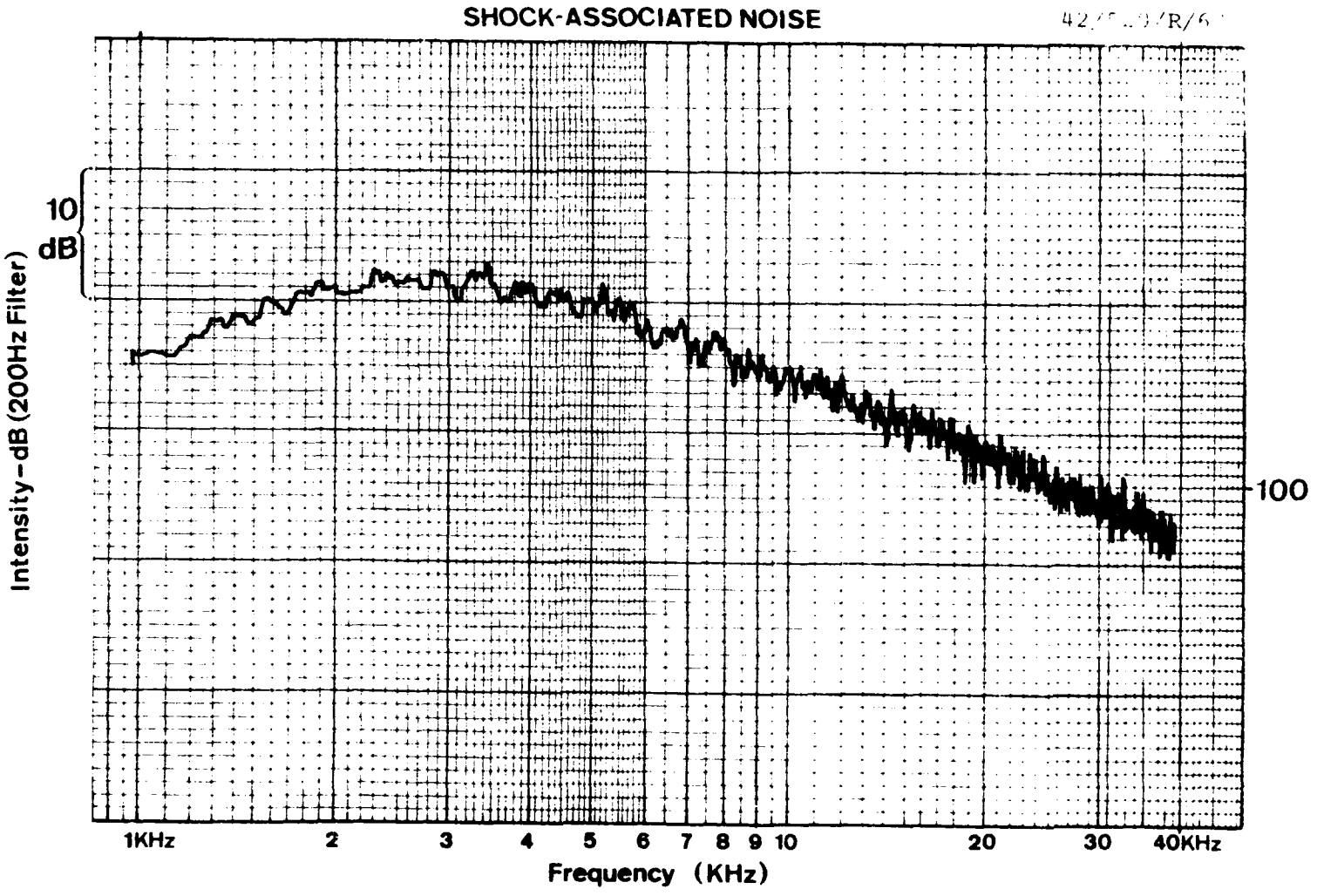
8
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
10
dB
Intensity-dB (200Hz Filter)
100
1KHz
2
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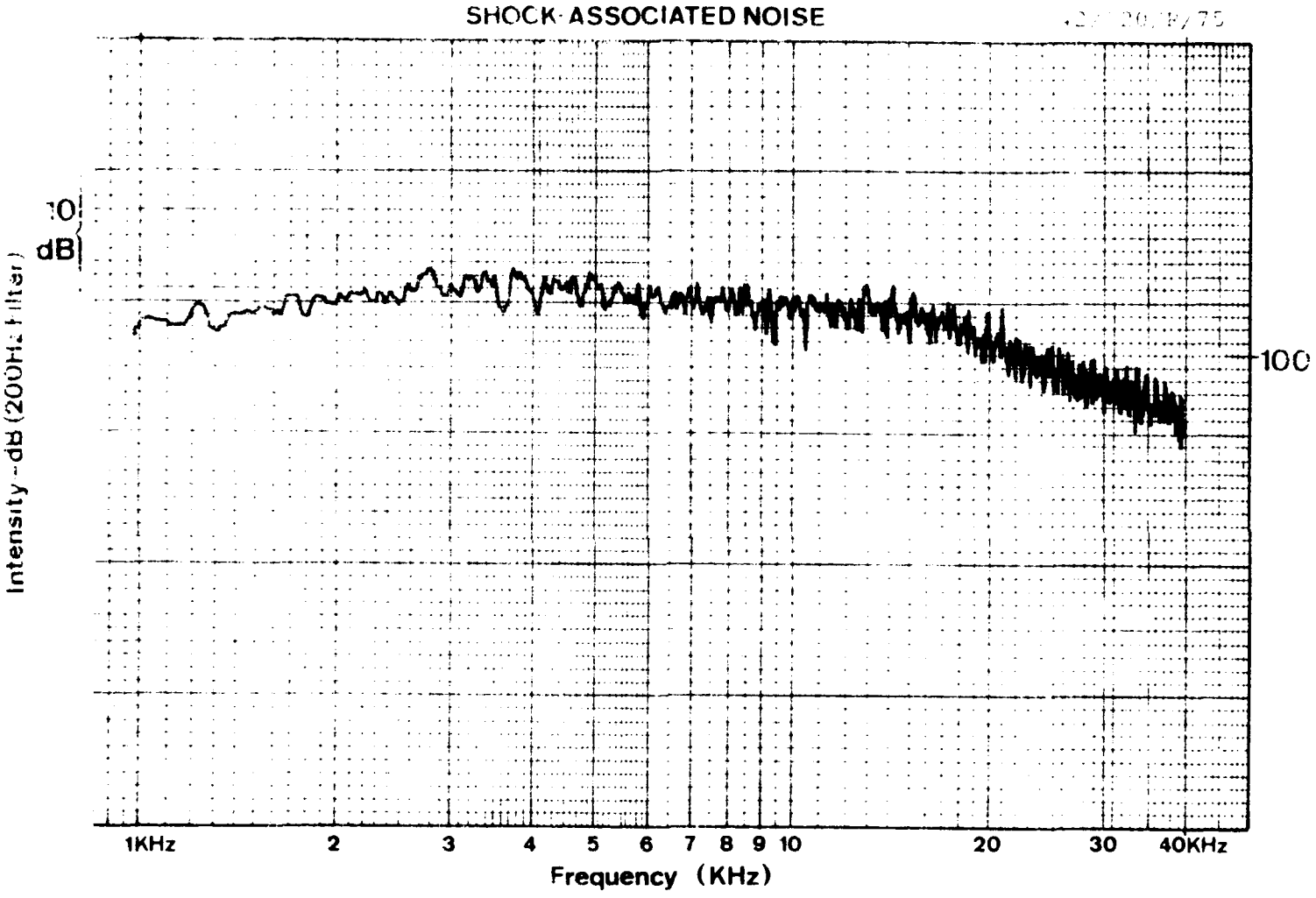
4
5
6
7
8
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
10
dB
Intensity - dB (200Hz Filter)
100
1KHz
2
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4
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6
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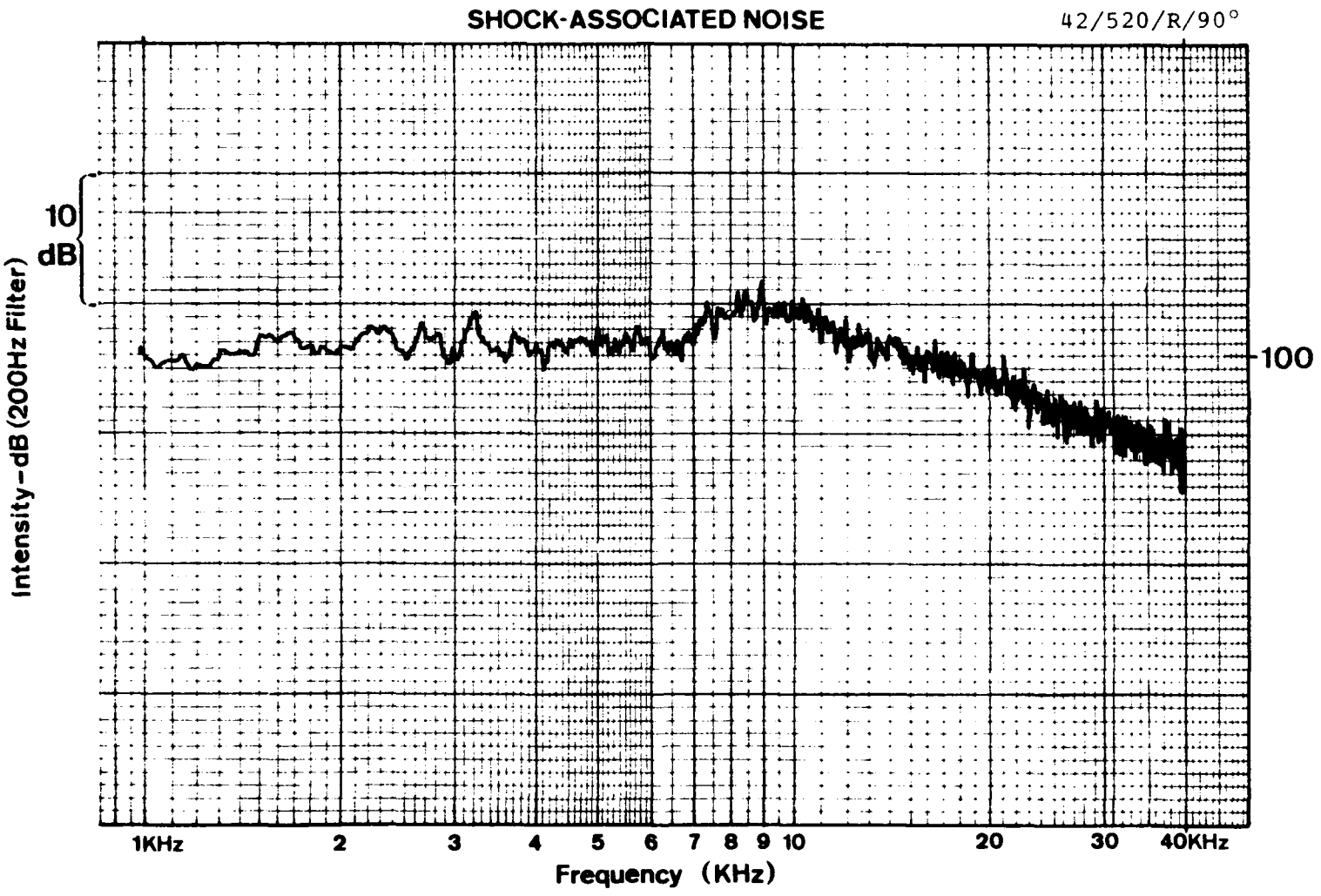
8
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
42/520/R/90°
10
dB
Intensity-dB (200Hz Filter)
100
1KHz
2
3
4
5
6
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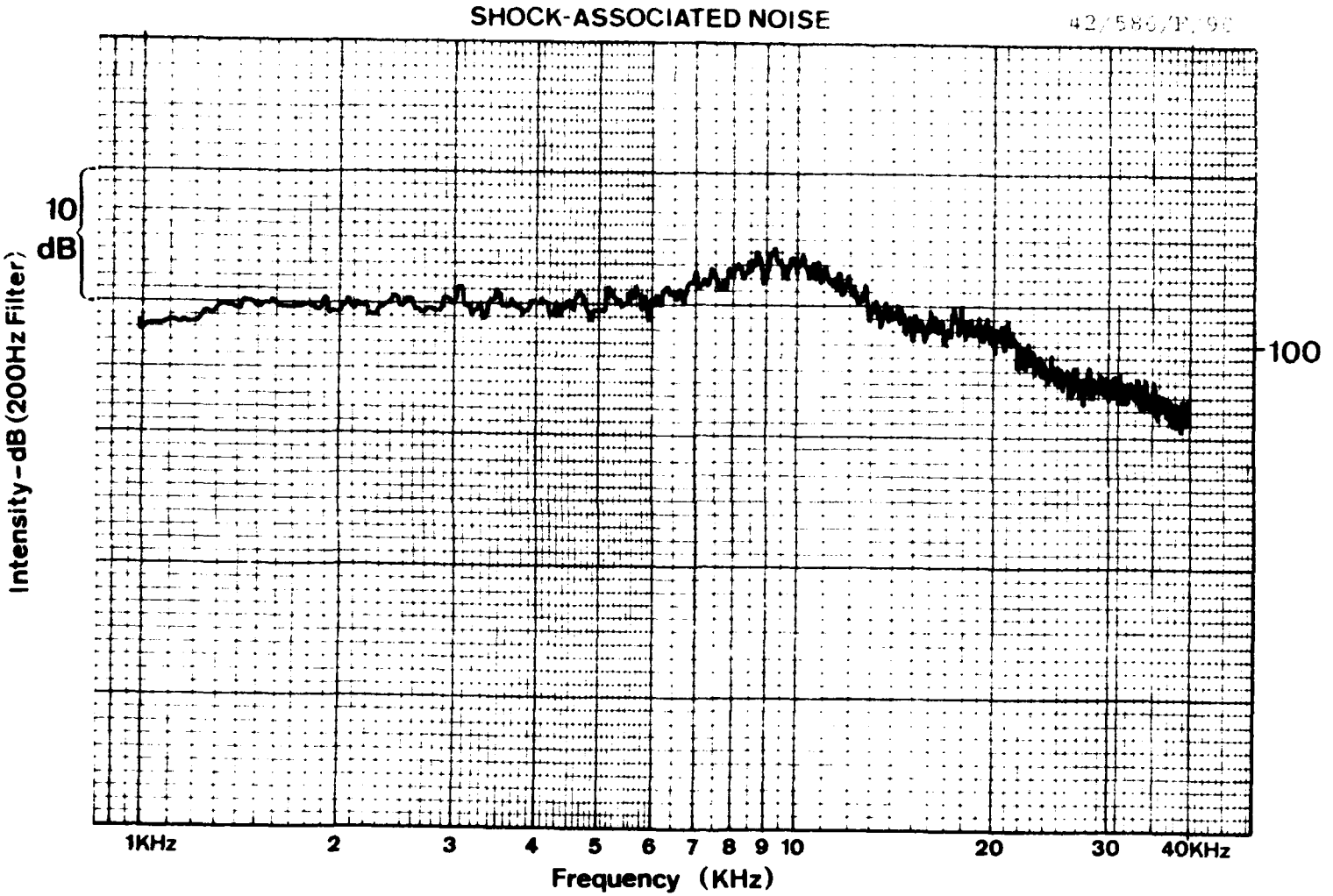
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
42/586/P/92
10
dB
Intensity - dB (200Hz Filter)
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1KHz
2
3
4
5
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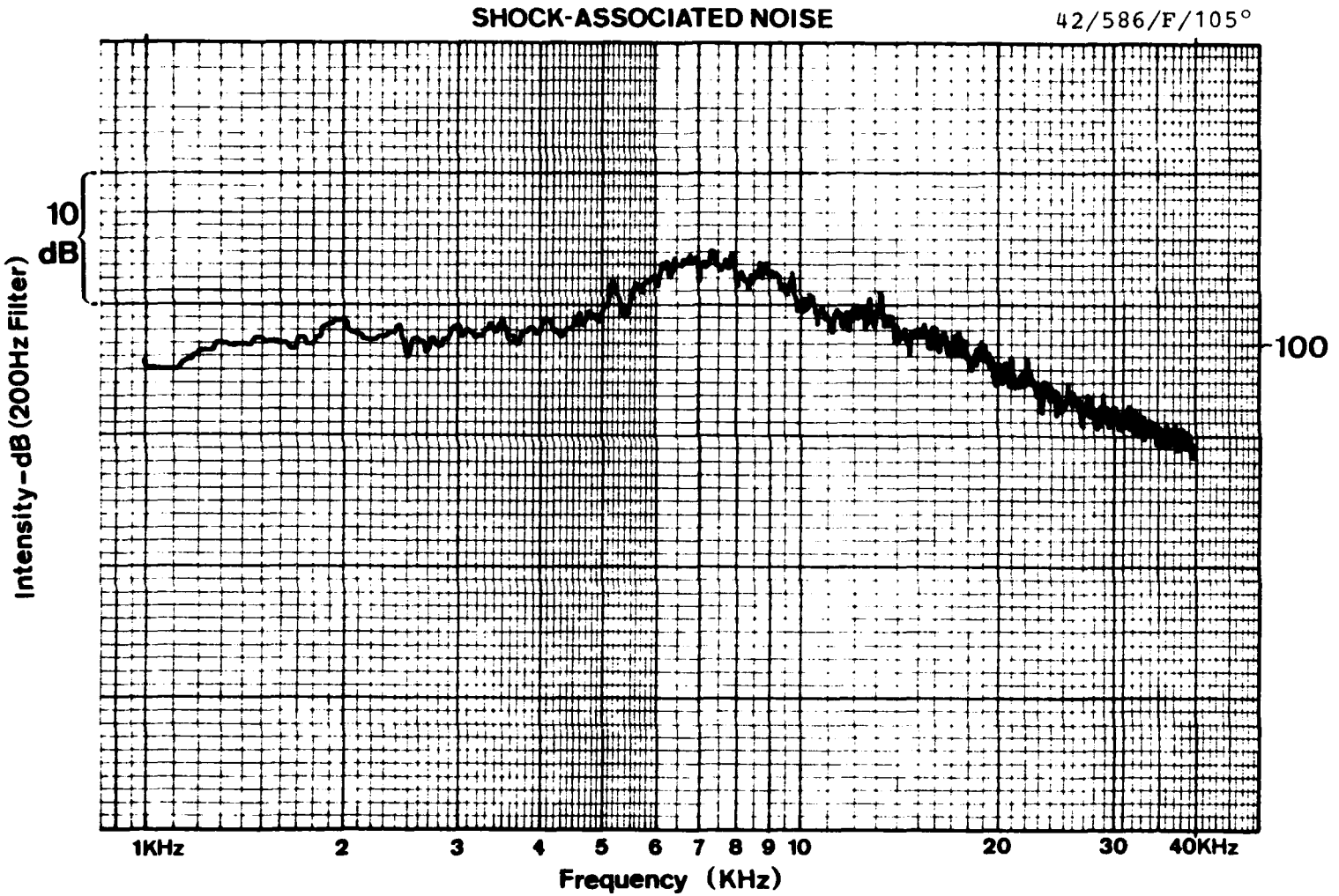
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
42/586/F/105°
10
dB
Intensity-dB (200Hz Filter)
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1KHz
2
3
4
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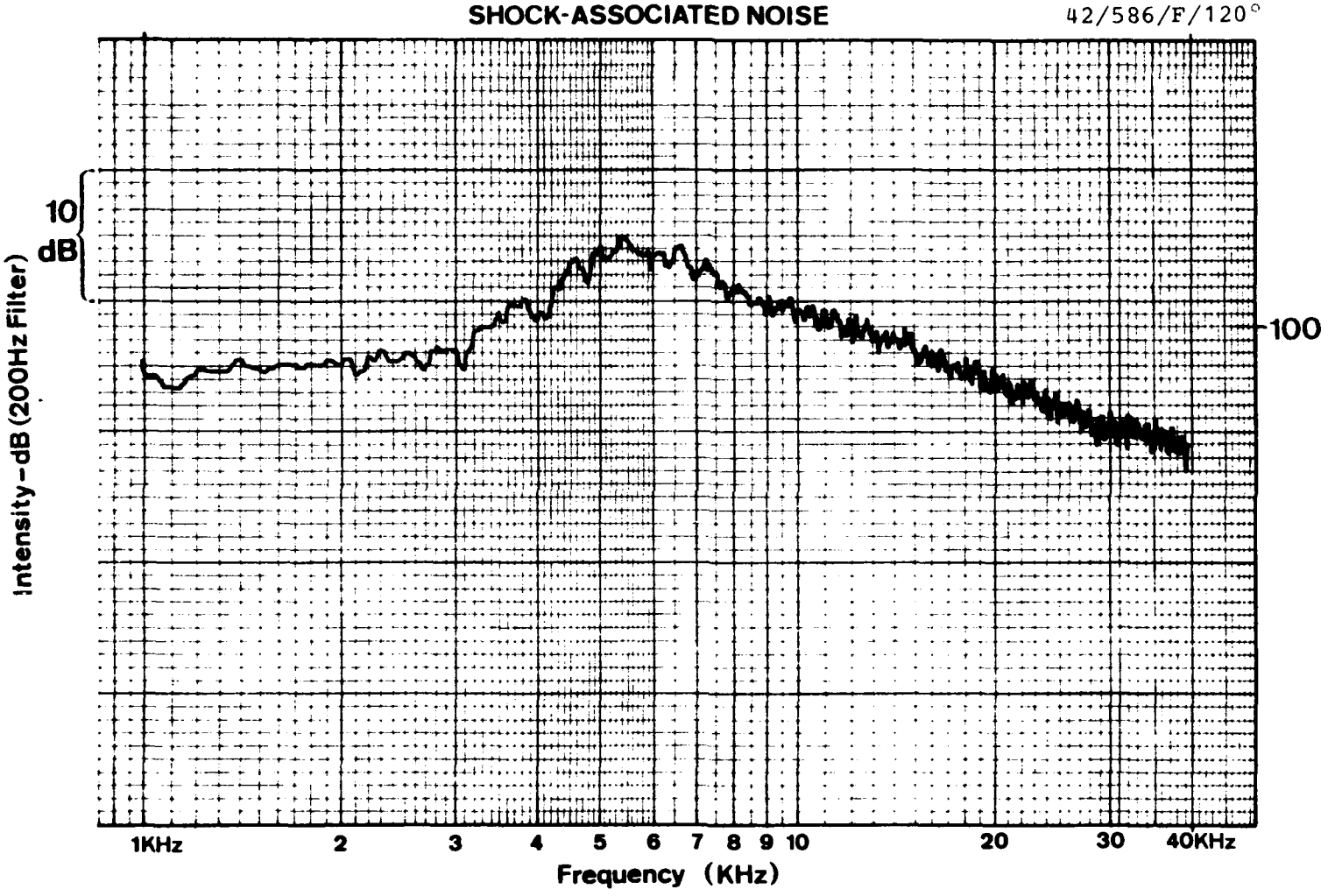
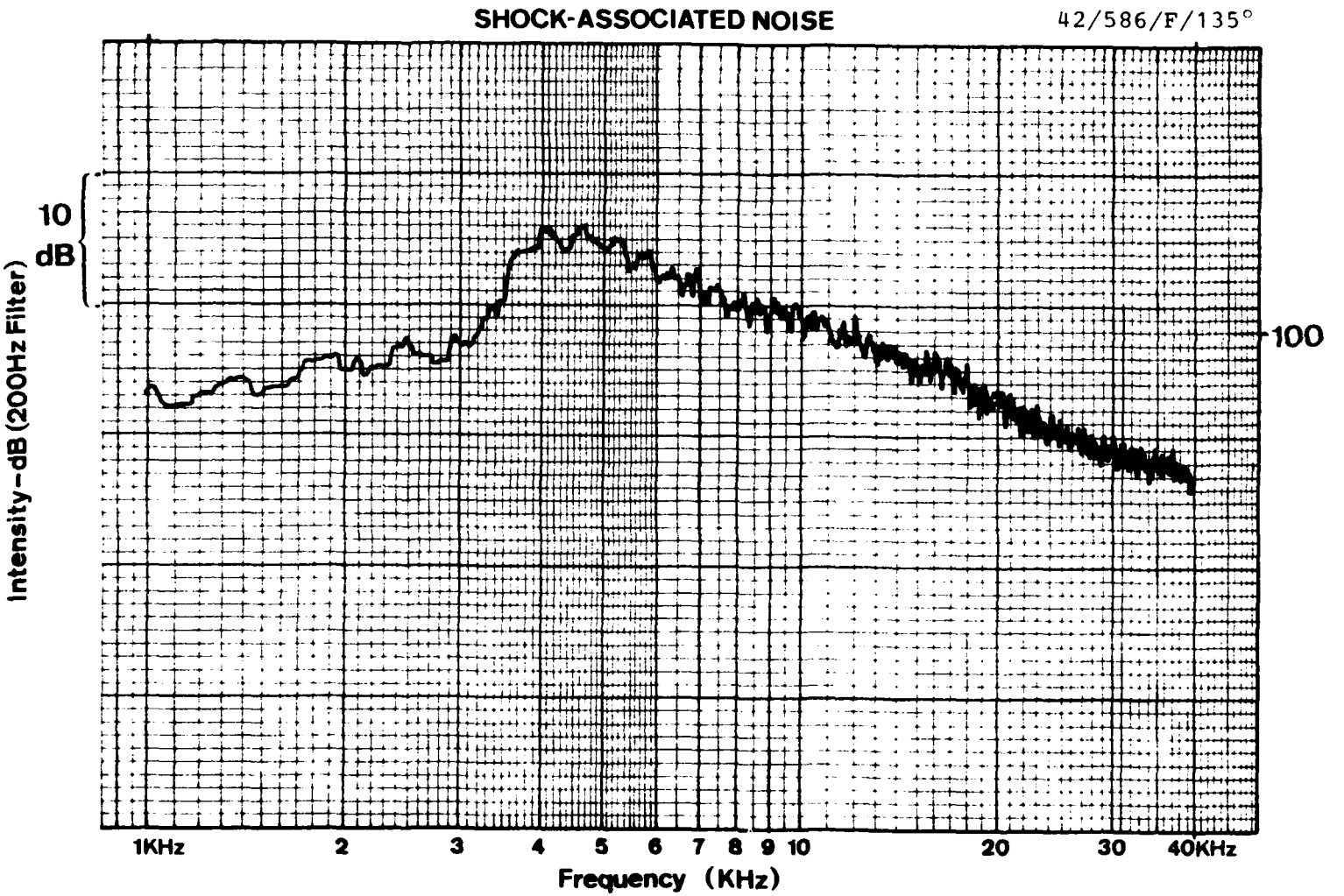
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
42/586/F/120°
10
dB
Intensity-dB (200Hz Filter)
100
1KHz
2
3
4
5
6
7
8
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
42/586/F/135°
10
dB
Intensity-dB (200Hz Filter)
100
1KHz
2
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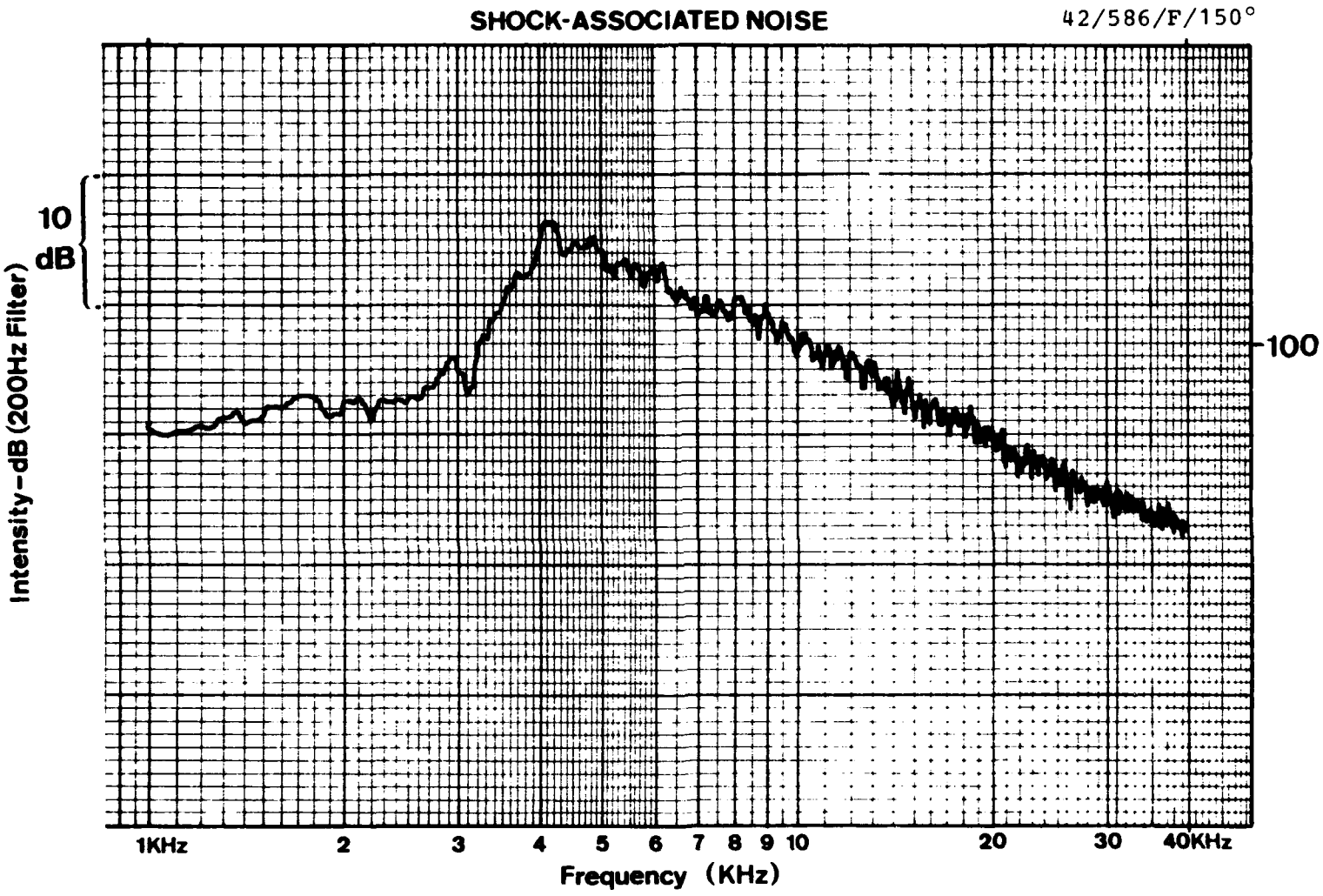
4
5
6
7
8
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
42/586/F/150°
10
dB
Intensity-dB (200Hz Filter)
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1KHz
2
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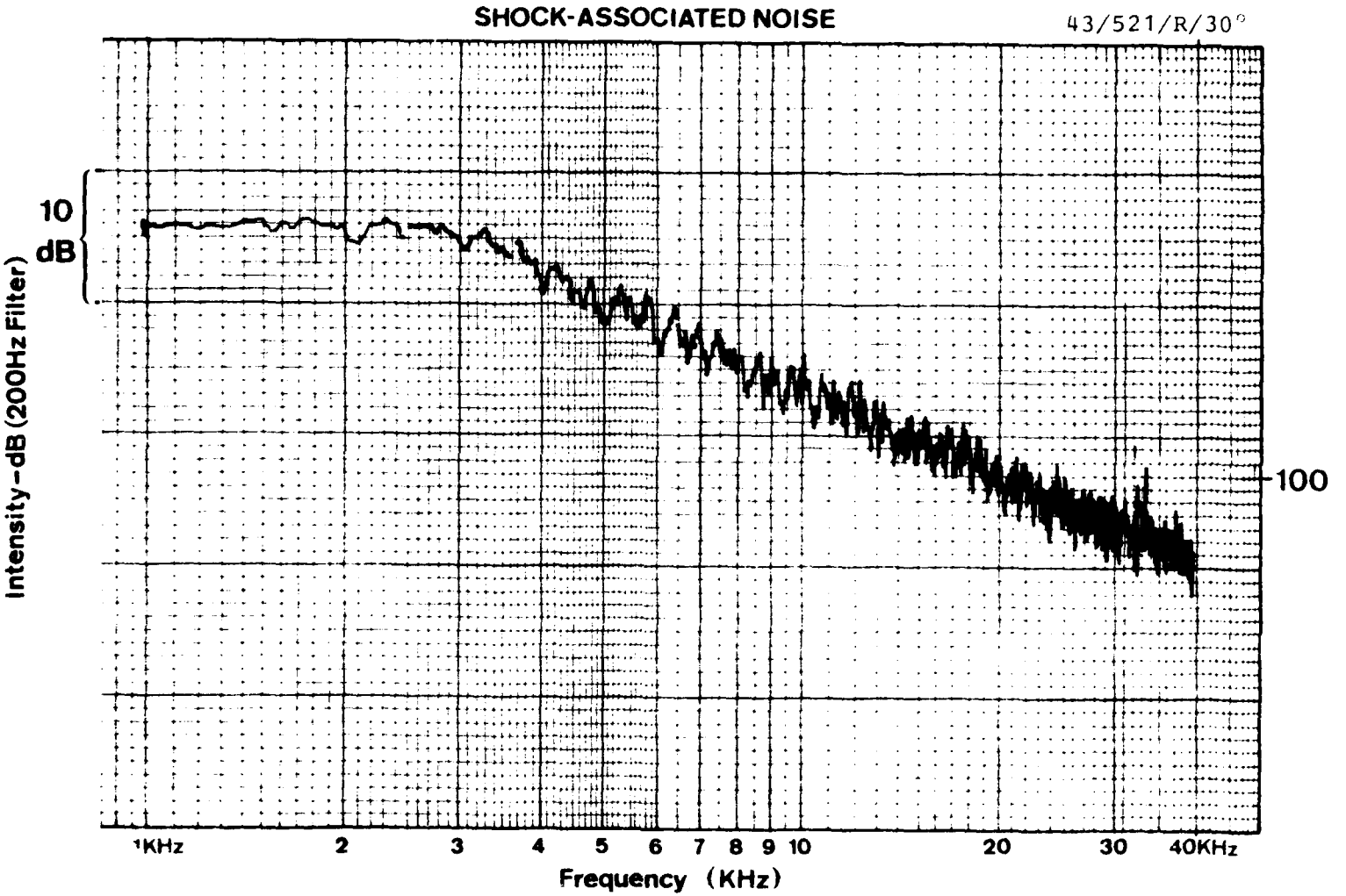
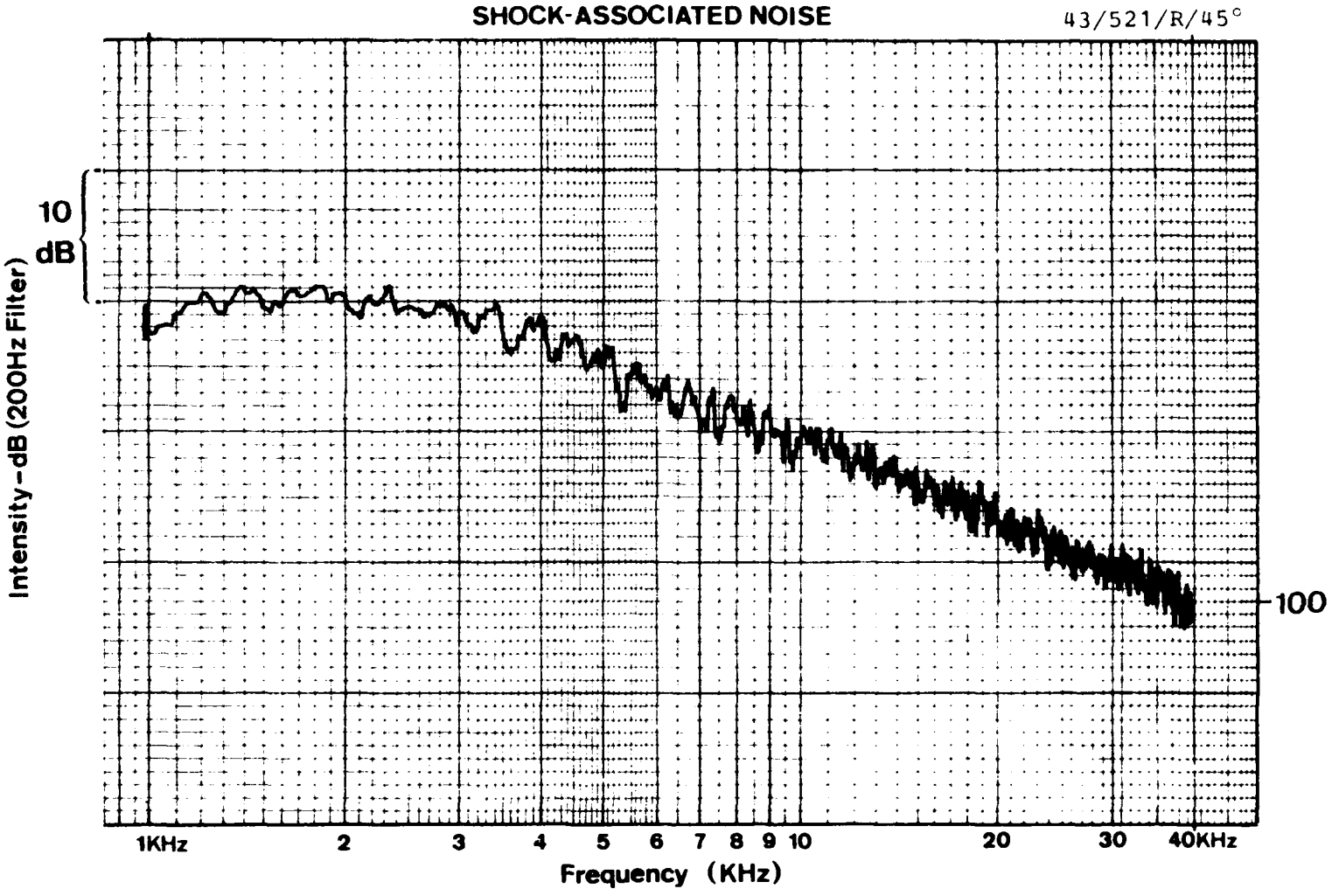
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
43/521/R/30°
10
dB
Intensity-dB (200Hz Filter)
100
1KHz
2
3
4
5
6
7
8
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
43/521/R/45°
10
dB
Intensity - dB (200Hz Filter)
100
1KHz
2
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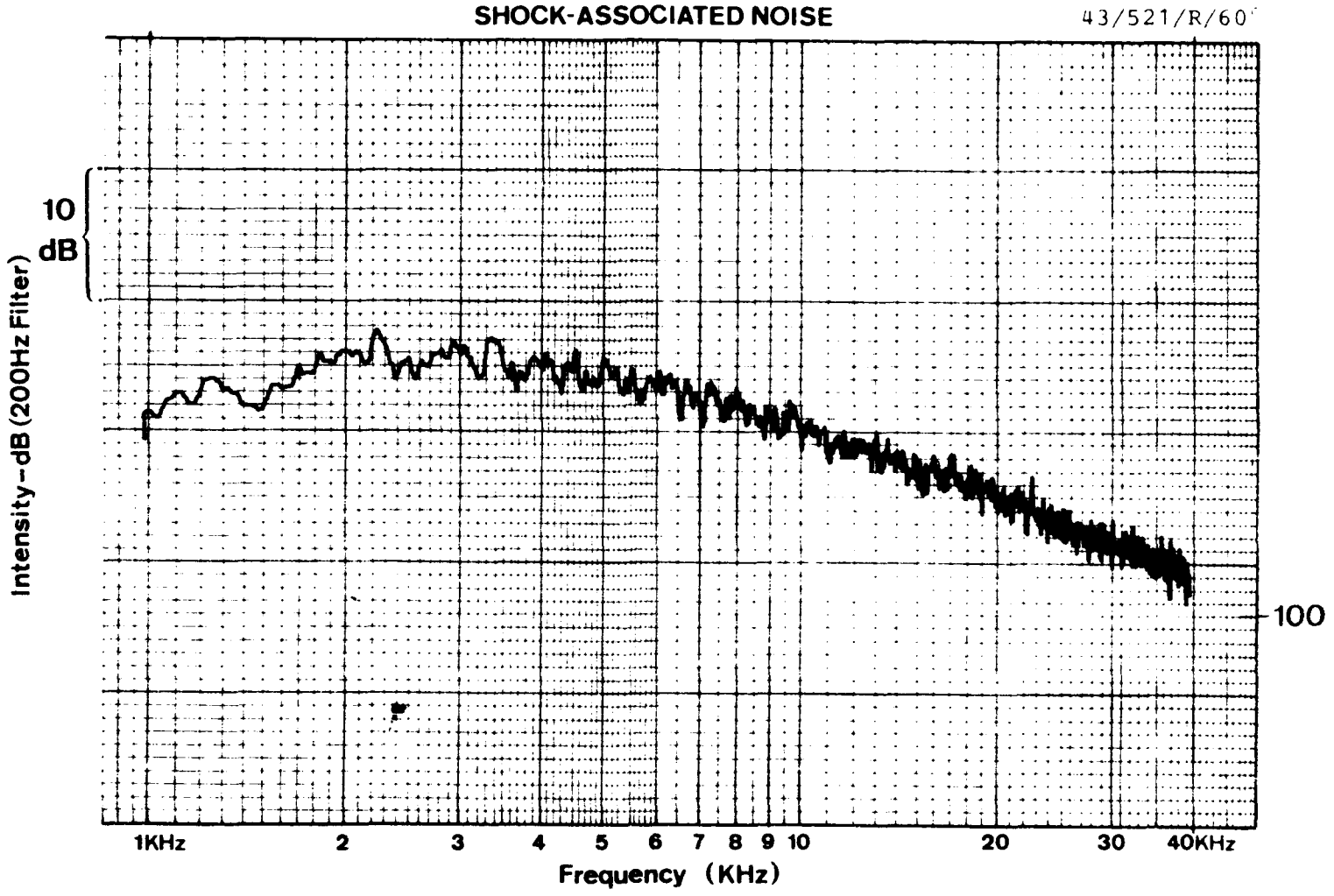
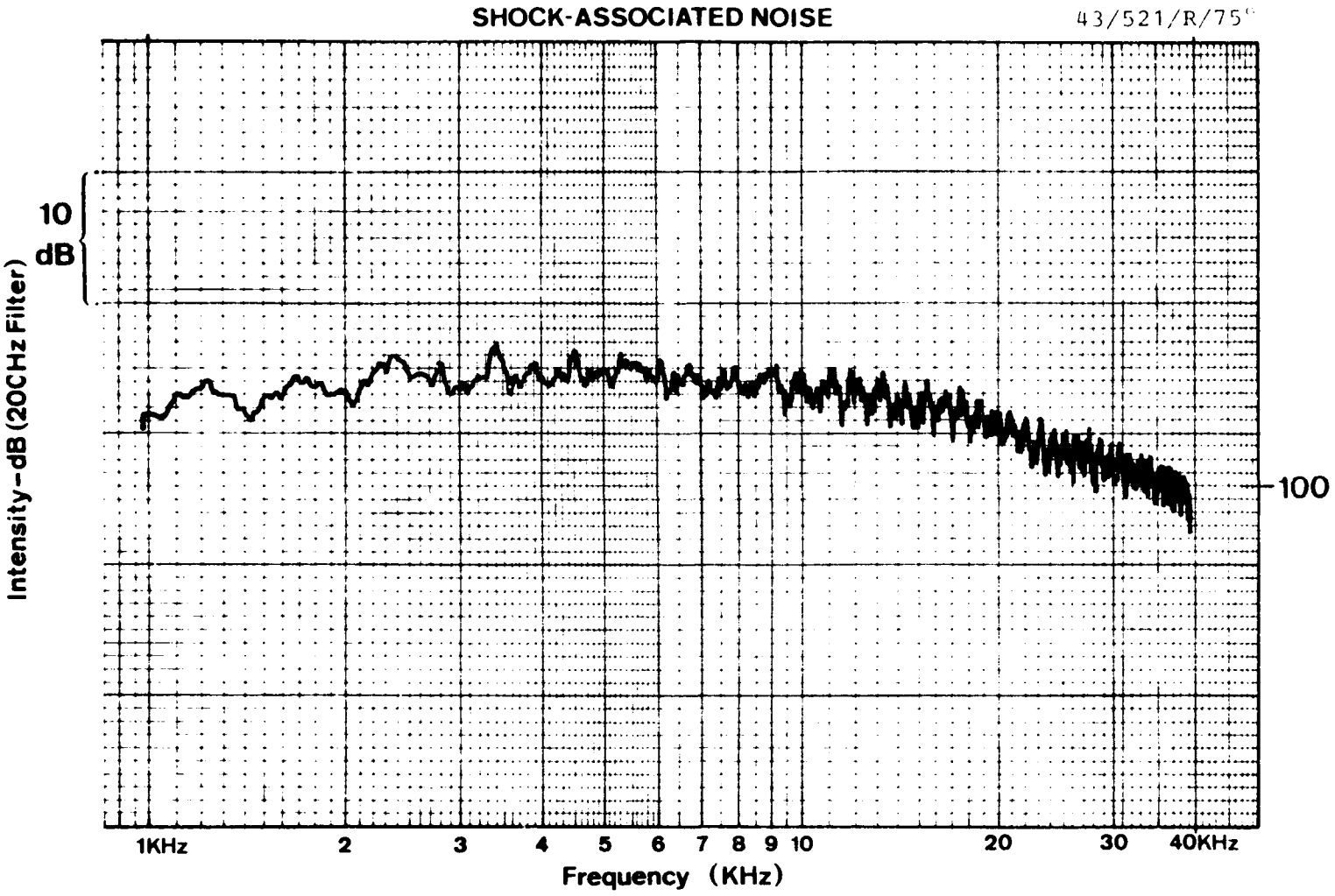
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
43/521/R/60
10
dB
Intensity-dB (200Hz Filter)
100
1KHz
2
3
4
5
6
7
8
9
10
20
30
40KHz
Frequency (KHz)

405


SHOCK-ASSOCIATED NOISE
43/521/R/75
10
dB
Intensity-dB (20CHz Filter)
100
1KHz
2
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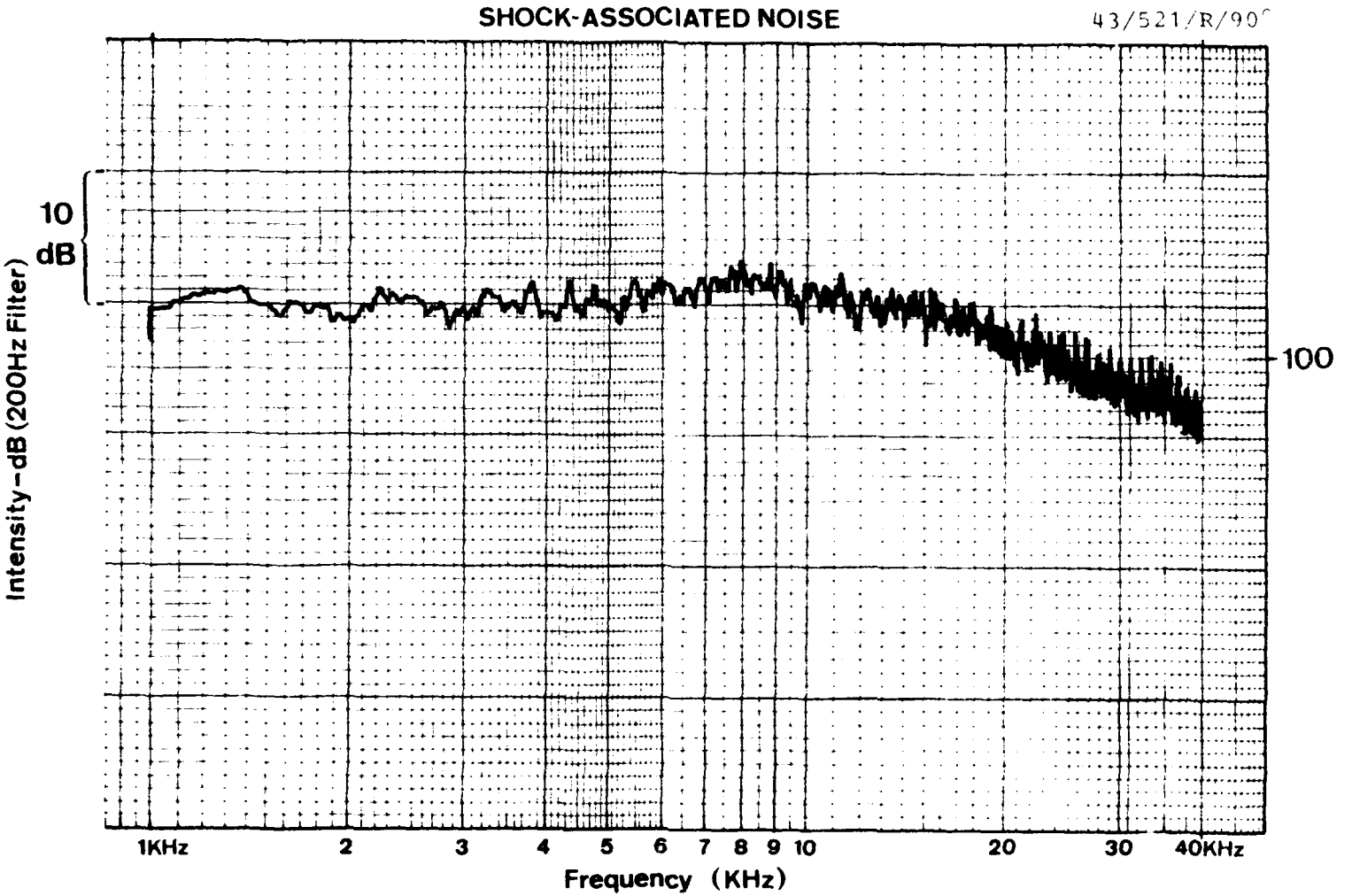
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
43/521/R/90°
10
dB
Intensity - dB (200Hz Filter)
100
1KHz
2
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4
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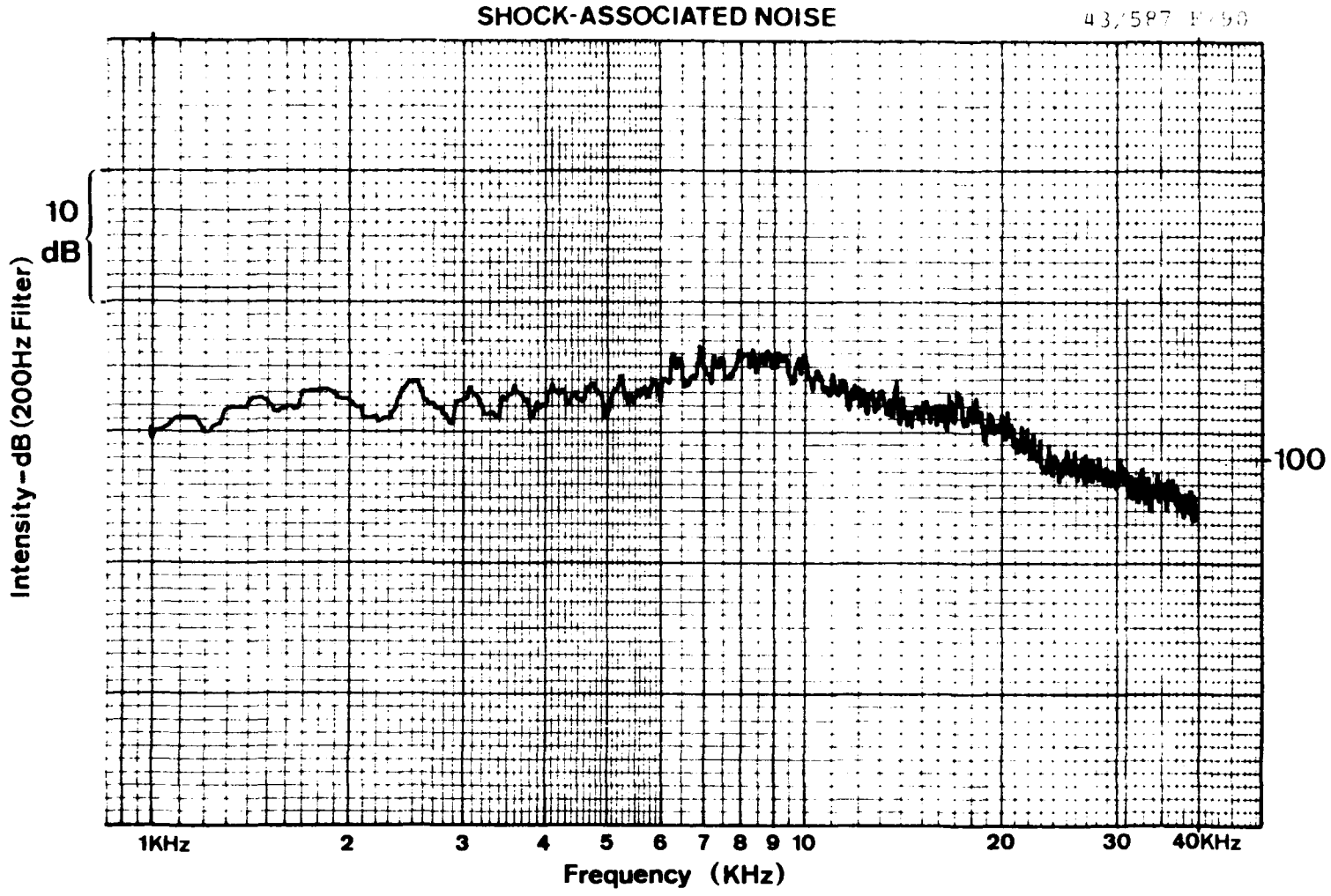
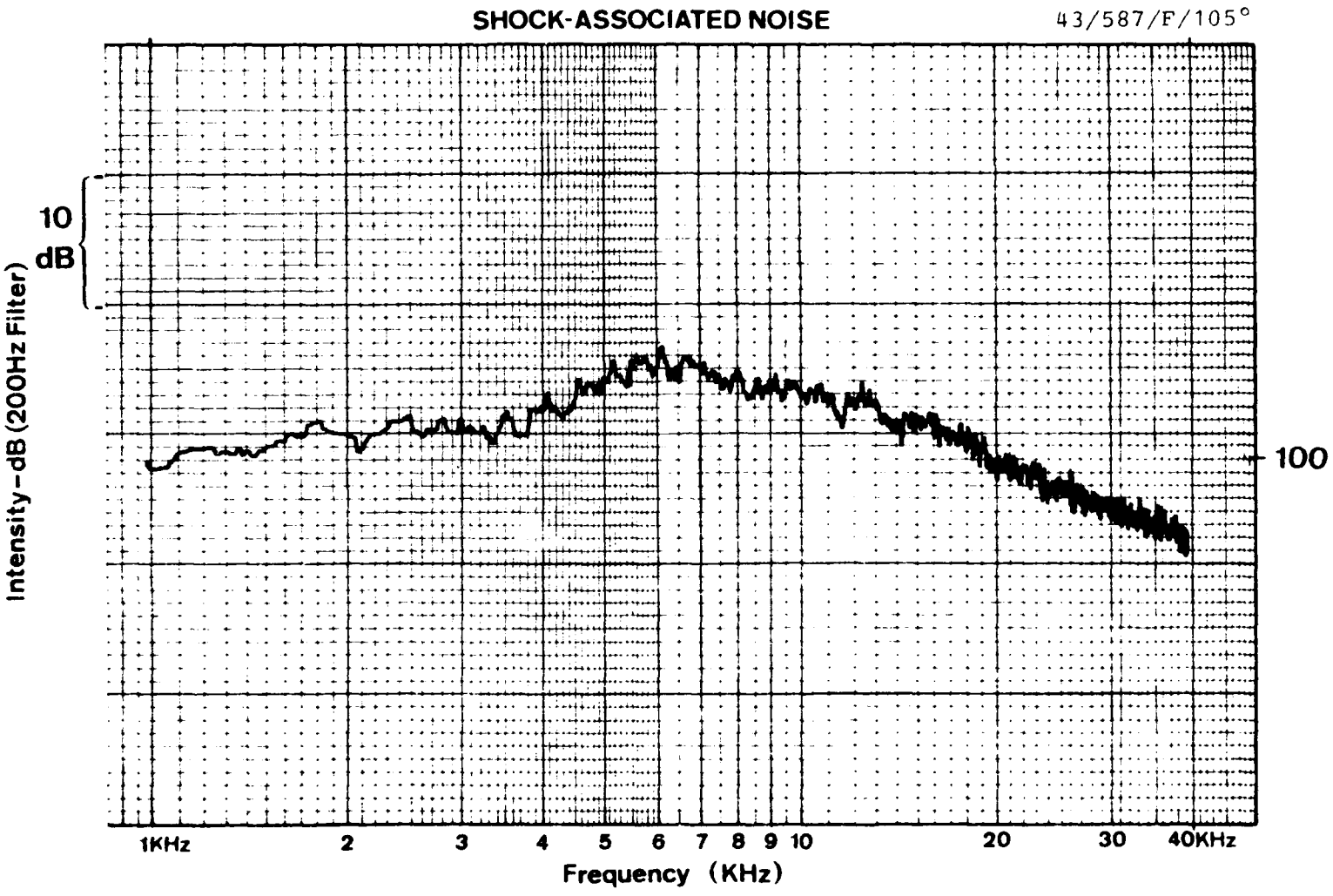
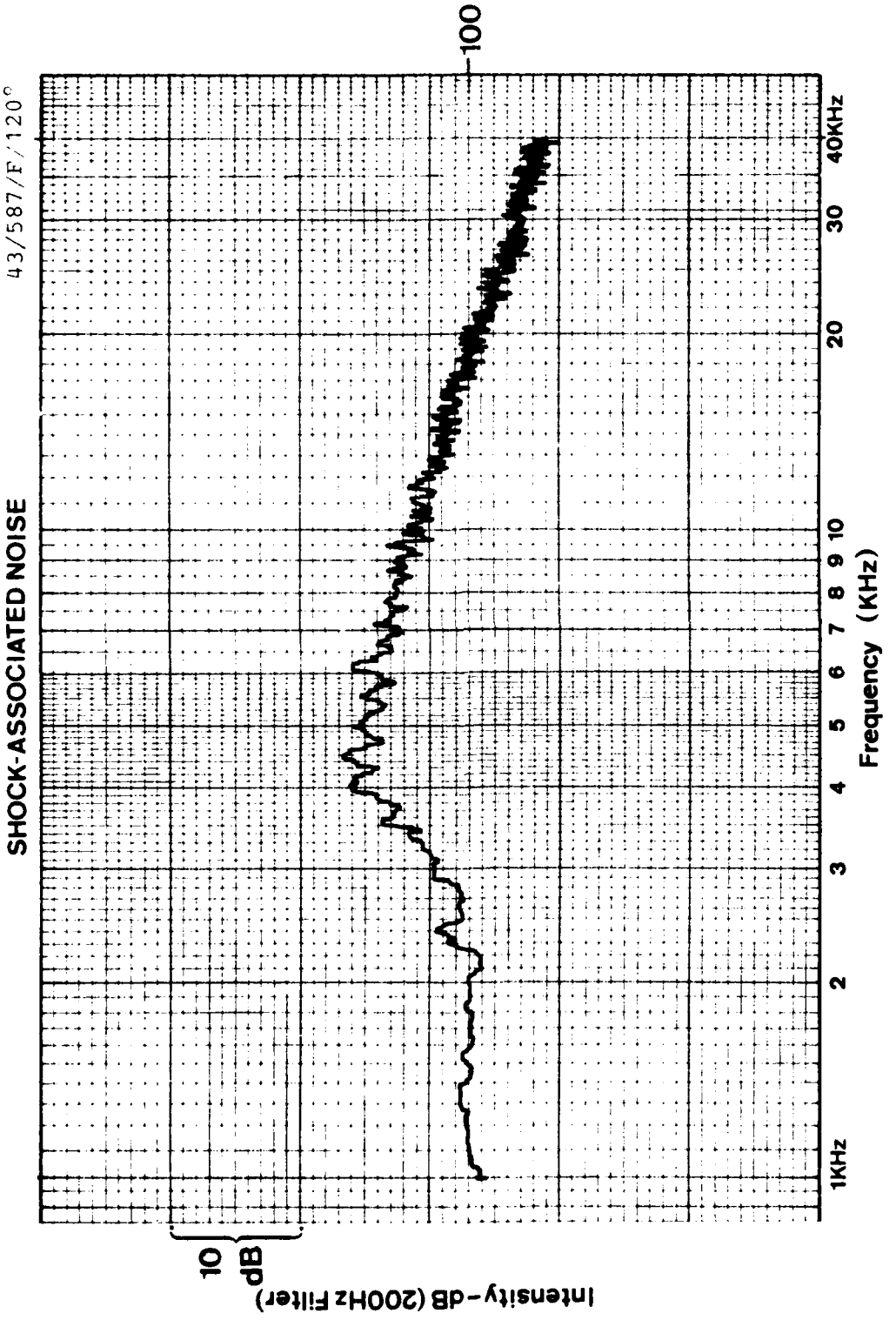
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
10
dB
Intensity-dB (200Hz Filter)
100
1KHz
2
3
4
5
6
7
8
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
43/587/F/105°
10
dB
Intensity - dB (200Hz Filter)
100
1KHz
2
3
4
5
6
7
8
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
43/587/F/120°
100
10 dB
Intensity–dB (200Hz Filter)
1KHz
2
3
4
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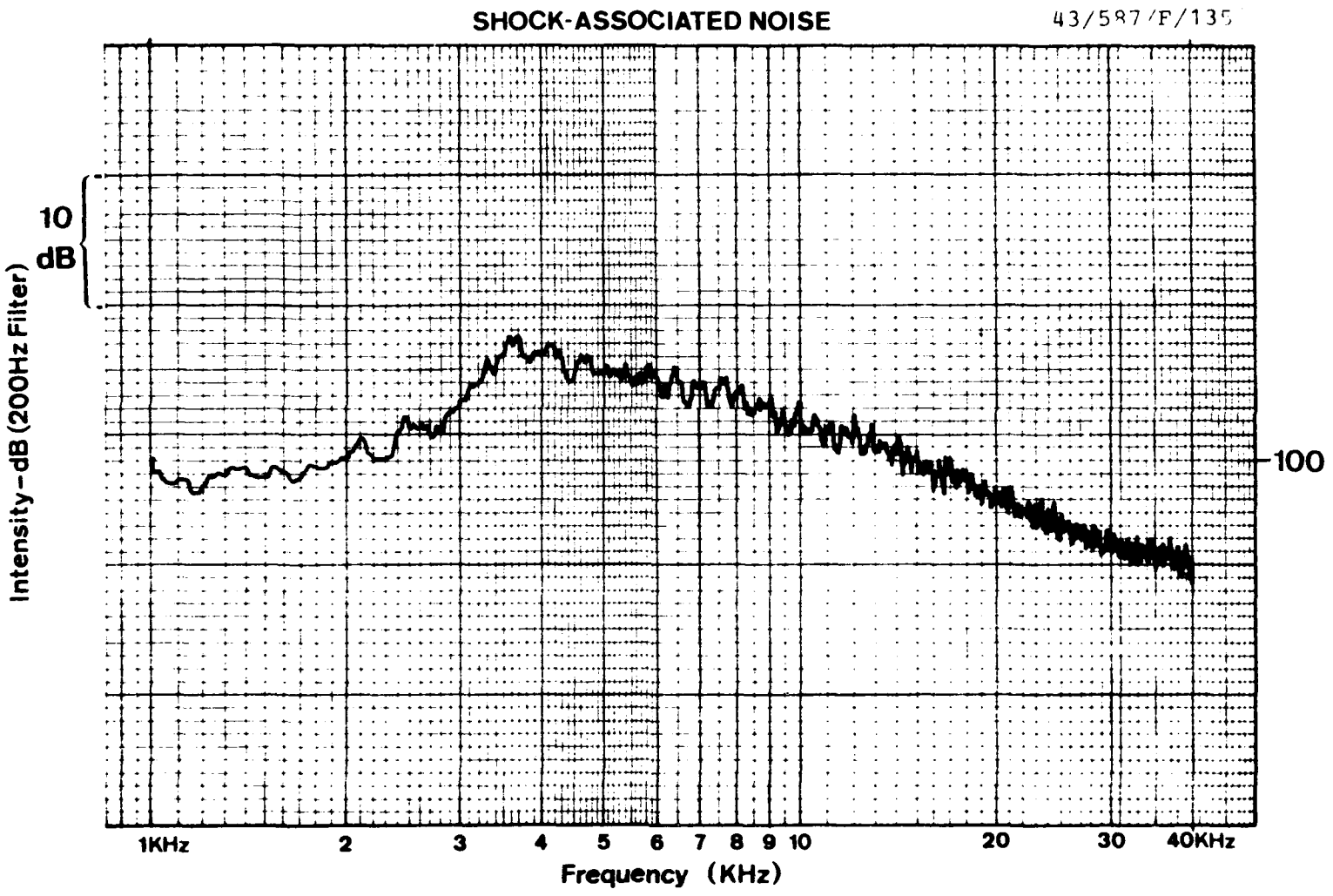
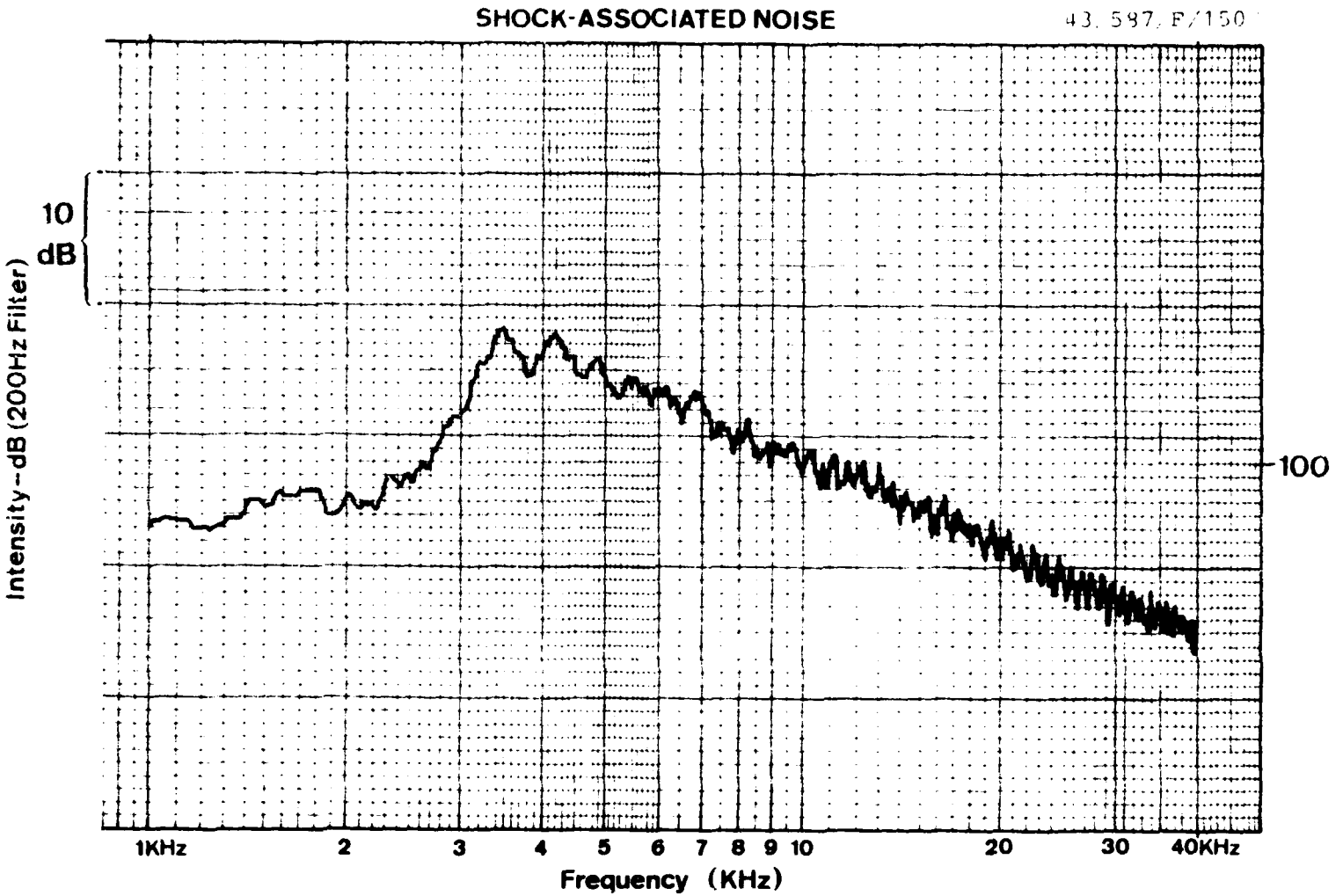
6
7
8
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
43/587/F/135
10 dB
Intensity–dB (200Hz Filter)
100
1KHz
2
3
4
5
6
7
8
9
10
20
30
40KHz
Frequency (KHz)


SHOCK-ASSOCIATED NOISE
43, 587, F/150
10
dB
Intensity--dB (200Hz Filter)
100
1KHz
2
3
4
5
6
7
8
9
10
20
30
40KHz
Frequency (KHz)